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ABSTRACT

This report, the fifteenth in a series of twenty completed by the Children's Environments Advisory Service for the International Year of the Child, 1979, presents a guide for planning play spaces on roof decks in high density family housing projects where on-grade land is too scarce or too expensive for development as communal recreation space. The technical constraints were evaluated and the play potential of play spaces were examined in case studies of communal roof decks that include play spaces. Technical design alternatives were developed for the provision of safe and stimulating play opportunities for children. (A site visit checklist, a site visit observation form and related correspondence are appended.) (Author/RH)

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THE POTENTIAL OF ROOF DECK PLAY SPACES

Research Project 15.

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THE POTENTIAL OF ROOF DECK PLAY SPACES

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ⓒ CMHC 1979

October, 1979
Vancouver, B.C.

PREFACE

The Children's Environments Advisory Service's Research and Development Program for the International Year of the Child has as its objective the advancement of good environmental planning and appropriate family housing design that supports the needs of children and youth (0-18).

An in-house CMHC IYC Committee, consisting of representatives of various CMHC divisions that impact on family housing and regional representatives, identified the gaps in the field. The committee selected projects of directed research to close these gaps and identify problem areas, to find solutions where possible, and to provide input to corporate policy and programs in the field of family housing. Five categories of investigation were selected to respond to these needs:

- Assembly/Production of Data

  To assemble a data bank on the condition of children in relation to their residential environment and to relate this data to data being collected by other departments and agencies.

- Evaluation

  To examine existing housing situations catering to the needs of families with children at home.

- Design and Awareness Material

  To develop proposals for improving housing and the surrounding environment through design.

- Demonstration

  To construct demonstration facilities for children, or to introduce improved facilities for children in on-going projects.

- Development of Policy Proposals

  To review the condition of children in Canada, and present proposals to meet or correct emerging problems in relation to housing.

The CMHC IYC Committee will develop for CMHC Management a policy paper based on the facts, figures and findings of the Research and Development Program for IYC, with implications for future policy, programs and research affecting family housing.

The Children's Environments Advisory Service plans to use the focus on children made possible by the Year of the Child to plan new directions for our service. We intend to conduct further research, provide additional resources and sustain the momentum of our advocacy role within CMHC.

This project is one of 21 projects (titles on last page) in the Research and Development Program for the International Year of the Child. These reports are distributed by the Children's Environments Advisory Service.

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We wish to acknowledge the following persons who were contacted during the preparation of this report for their interest and information:

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Dr. Mary J. Wright, Professor and Director, University Laboratory Preschool, University of Western Ontario; London, Ontario

Carolyn Larsen, Director, Child Life Department, Montreal Children's Hospital; Montreal, Quebec

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Mr. Ron Williams, Director, School of Landscape Architecture, University of Montreal; Montreal Quebec

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I · INTRODUCTION

The roof deck has limitations in design and technical creation and in order to provide a variety of play experiences for children much thought must be placed upon the adaptation of this type of environment as a play space. Questions arise which, as yet, are unanswered: Can different types of play (social, physical, creative, cognitive, quiet/retreat) be accommodated on a roof deck environment? What differences are there between the grade level play space and one which is five or more storeys above the ground? What would a roof deck play space be taking advantage of as far as the child is concerned? What activities can be carried out on a roof deck which are exciting and stimulating to children? These questions and more are the framework for investigation in this report. They are answered as well as possible and with total consideration toward the child and his/her play enjoyment.

The objectives of the report are to investigate the potential of roof decks for play space development in the following ways:

1. To present a study of roof deck play space examples existing in Vancouver and throughout Canada in terms of play patterns, usage by age groups, safety and durability of play equipment;

2. To present technical and design suggestions

in terms of the play opportunities for children and supervision and activities for parents/adults who accompany them;

3. To provide technical and design alternatives for play spaces on roof decks in residential complexes.

The intention of the report is to provide a useful guide for planning and designing roof decks for children's play. Innovative approaches, flexibility in design and specific technical application are required in the development of roof deck play spaces. As outdoor recreational space becomes more scarce and expensive within the urban core, roof deck space for play in residential, hospital, day care, and school situations will become a more feasible option.

II POTENTIALS AND CONSTRAINTS OF THE DESIGN AND TECHNICAL ASPECTS OF ROOF DECK DEVELOPMENT

Roof decks have been used for centuries as outdoor places to sleep on hot summer nights, places to stand guard, and places to create gardens. Today, in our culture, these are infrequent activities and the roof deck is generally not readily accepted as a place for daily living or, for that matter, a place for children to play. Consequently, the roof deck space viewed from surrounding upper storey highrise complexes are places "devoid of human or visual action."[1]

The roof deck represents a great amount of unused space and due to heavily populated urban cores we are now turning to the development of this space. It is necessary, therefore, to investigate what potentials and constraints this type of space offers.

The following section outlines some of the design and technical potentials and constraints for development of a roof deck both in general terms and for the use of children's play.

II.10 General Potentials

.Removed from street and city commotion: separates the users from noise, cars and busy commotion in the urban core;

- Privacy: because the roof deck is exclusive to the people and friends of the building, there is more privacy and a lesser risk of vandalism;
- Social Interaction: provides a space for occupants, children, parents/adults to interact as a community;
- Provides spaces which otherwise might be unattainable in the urban core: takes advantage of space which is unused and, thereby, wasted in areas where open space is scarce and expensive;
- Micro-climate: ideal location for optimum sun and fresh air by site planning and orientation;
- Unique challenge: a unique environment providing architects, landscape architects, and planners with the challenge to create new types of living spaces and activities;

II.11 Play Potentials

- Novelty of situation: potential thrill and excitement of playing on a roof deck level play space.
- Stimulation of the imagination: experiencing play from a totally new perspective of the surrounding environment is potentially stimulating both to designers and children;
- Proximity to home: offers a play space to children which is close to home and for those unable to

leave the premises unaccompanied, due to age or handicaps; especially suitable to preschoolers;

- Security: casual surveillance is plausible by parent; rooftops are easier to patrol and control than street-level areas;[2]
- Air and light: ideal location for taking advantage of good weather conditions;
- Micro-climate control: year-round activities are possible by micro-climate control of winds, rain, and sun by using screens and canopies. (Refer to CMHC - Roof Decks Design Guidelines - NHA 5220 79/01);
- Surface area: flat surfaces found on roof decks are the bases of many children's activities, including roller-skating, tricycle riding, and chalk games;
- Parapet wall: beyond the vital physical and psychological requirement for safety, the parapet wall is a potential play element when incorporated into the design of play activities. An example of this would be using the parapet wall or a portion thereof for peg games.[3] Further examples of this notion are explained in Section VI - Play Suggestions.

II.20 General Constraints

- Space: commonly limited to a small area where useable common space is rigidly defined due to mechanical systems, chimneys and vents found on the roof deck;

- Access: circulation systems (stairs, elevators) generally limit access to the roof deck and may be especially limiting to the handicapped;
- Social Integration: permitted use of the building premises other than by occupants limits the possibility of integrating with a large and varied number of people;
- Confinement: the roof deck must be surrounded for safety reasons by a parapet wall and/or the walls of surrounding buildings evoking feelings of confinement in some cases;
- Vertigo or dizziness: experiencing vertigo at high elevations;
- Weight: one of the most technically and cost significant constraints in terms of where and how much weight can be placed on the roof deck, with respect to people, plant and surfacing materials, and play equipment.
- Height: restrictions for plant materials, structures, canopies, etc. which possibly may turn over due to high wind velocity commonly experienced on roof decks;
- Anchoring: consideration for the stability of objects such as planters, benches, screens, etc. restricts where and how (technically) objects are placed so that the protective water-proofing membrane below the roof deck platform is not damaged and in order that

weight factors are respected when utilizing earth or concrete for anchorage;

- Inclimate conditions:
  - Winds - usually found to be at higher velocities on roof decks and wind tunnels, created between tall building structures, are common occurences
  - Sun - intense sun causes problems to people, plants and surface materials; reflection from windows and certain types of surface materials could limit general use of particular areas of the roof deck;
  - Rain - the most important factor is with respect to drainage. Unlike grade-level activities water cannot seep into the ground, but must be efficiently drained in order to prevent damage to floors below and to the surface material itself.
  - Snow - a problem due to its removal, especially in small areas in which equipment movability is difficult, and in some cases where weight might be a problem;
- Drainage: one of the most technically limiting factors of roof deck development as any damage to the roof deck platform or the floor(s) below will restrict use of the roof deck. (Refer to CMHC - Roof Decks Design Guidelines - NHA 5220 79/01).

II.21 Play Constraints

.Space: limited space for provision of all types of required play (social, physical, creative, cognitive, quiet/retreat). Activities and play equipment differ with ages of children as well as for parents/adults and common space limitations on roof decks constrain the type and amount of play equipment and activities desired;

.Scale: overwhelming effect of the buildings related to the roof deck play space which may affect behaviour and play by causing fear, tension and/or vertigo;

.Surveillance: inability to watch children play from all locations of the building;

.Noise: may carry to surrounding apartments of the complex or apartment/office buildings adjacent the roof deck play space;

.Surface of the roof deck: commonly a concrete slab which lacks an exciting terrain which is experienced on grade, i.e. rocks, mounds, bush and earth;

.Monotony: due to a small and bounded space with a lack of interesting terrain features the novelty of a roof deck experience may soon wear off;

.Parapet wall: provokes a feeling of being enclosed or bounded within a space; must discourage urges for climbing and throwing objects over the wall;

.Inclimate conditions: "Climate has a great effect upon play and behaviour, especially winds and low temperatures."[4] Sun exposure, shadow caused by tall buildings, and wind velocity commonly experienced on roof deck situations limit the activities and the use of the roof deck;

- Anchoring: anchoring play equipment to the roof deck platform requires special attention in order that safety is ensured and damage of the roof deck platform or the protective water-proofing membrane is not risked;
- Weight: constrains types of play equipment, types of activities, number of users, and placement of equipment. Frequently, more limiting following construction of the roof deck than during construction;
- Height: restricted height of play equipment near parapet walls and certain activities such as basketball due to the risk of objects being thrown over parapet wall;
- Natural Elements: trees, shrubs, rocks, water, sand and earth are all necessary in a play environment, and engage limitations such as weight, exposure, size, type and management;
- Storage: space may limit the storage necessities requirement for some play activities;
- Supervision: small children requiring supervision, as well

as particular activities which require supervision, advocate that interests and space be available to accommodate parents/ adults;

- Maintenance: a necessary component in the children's play space for mechanical and safety precautions;
- Safety: a relaxed atmosphere on a roof deck play space environment can only be accomplished when safety measures have been designed into every facet of play activity, including location of play equipment, the play equipment itself, surface materials and the parapet walls.

II.30 Summary

The development of a roof deck either in general or in play terms involves many constraints as well as potentials. Fundamentally, the constraints appear to out-weigh the potentials. Innovative solutions are, therefore, necessary to overcome these limitations. However, a disadvantage may become an advantage if alternate approaches are sought in the design of children's play spaces on roof decks. An example of this is wind velocity. High winds could feasibly become an advantage if they are incorporated into a play theme in which windmills, water movement and flags and banners are manipulated by children so as to demonstrate as a learning experience the effects, power and changes of the winds. Another example of turning a disadvantage into an advantage is the notion of using the parapet wall as part of the play equipment. This could be handled by incorporating glass or steel mesh into the parapet wall to allow views to strategic locations or by initiating wall games such as moveable and coloured pegs.

The challenge for architects, landscape architects and planners is to overcome constraints, develop the potentials and to successfully present the necessary components of a roof deck play space which allows children the ability to explore reality in a near natural environment in an urban location.

III CASE STUDIES

The following section describes the roof deck play spaces studied in the City of Vancouver. The most available examples were garage roof decks. Play was observed at each location on different days of the week and during various times of the day. An example of a Site Visit Checklist and an Observation Sheet used to document findings at each roof deck play space are attached in the Appendix of this report. Related problems and benefits of roof deck play spaces are summarized at the end of this section.

III.10 Case Study #1

A LOCATION 1424 Comox Street, Vancouver, B.C.

B ROOF DECK CHARACTERISTICS

.Deck Type - garage roof deck

.Height above Grade - on grade, with parking underground

.Type of Bldg. - residential apartment complex

.# of storeys - 2 storey apartment complex

.# of units - 29 units

.Surfacing - concrete

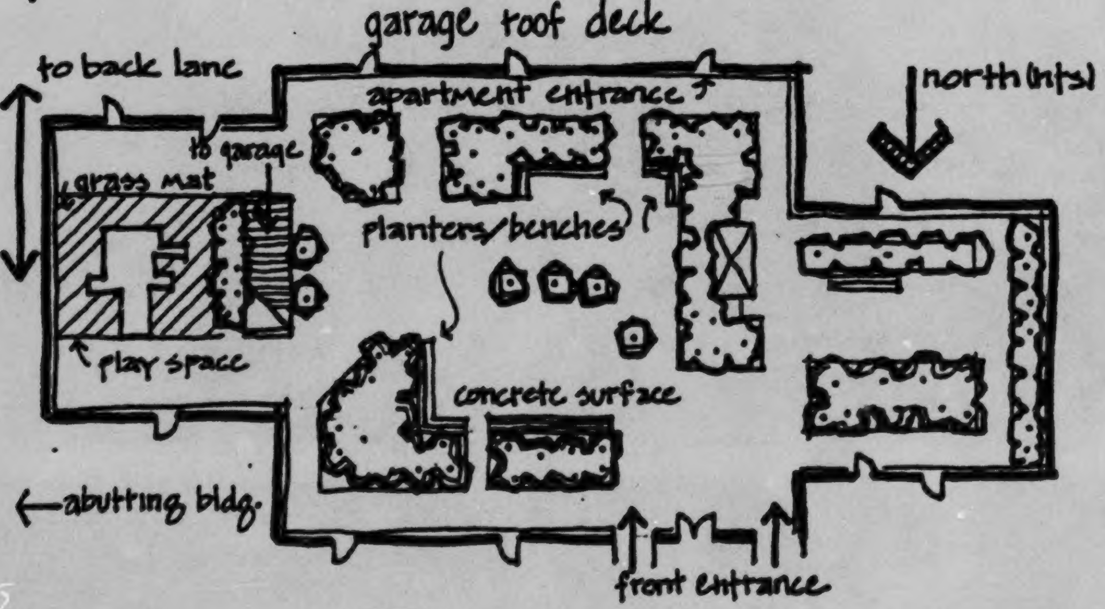
.Containment - contained by building on two sides & no containment is necessary as it is on grade

.Access - access to garage roof deck from first floor apartments is directly at grade. Access from the second floor is by balconies and stairs. There are two accesses from the street; one in front of the complex and one from the back lane behind the complex. All apartments face inward onto the garage roof deck.

•Special Characteristics

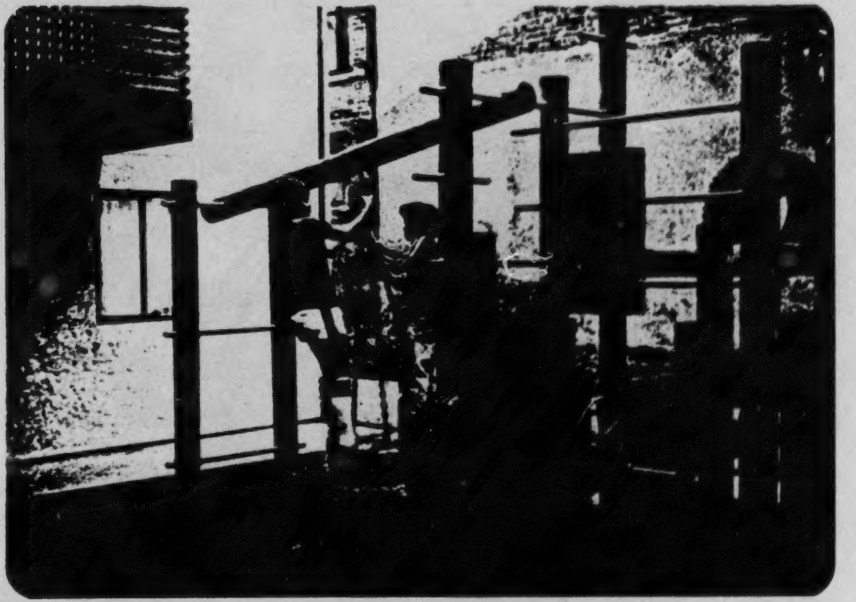
The layout of the garage roof deck is made up of large wooden planters which incorporate benches, and a small area (approximately 1/10 of the total area of the roof deck) is devoted to a children's play space. The total area of the garage roof deck is 424 square meters. See sketch #1 below:

SKETCH #1


garage roof deck
to back lane
apartment entrance
north (nts)
to garage
grass mat
planters/benches
play space
concrete surface
←abutting bldg.
front entrance

C PLAY SPACE CHARACTERISTICS

- # of children on premises - 30 children
- Size of area - 64 square meters
- Type of equipment - one Big Toy Structure, with tire swing
- Type of play - physical, creative, social and quiet



PHOTOGRAPH #1 - Showing play equipment

- Accessibility to Play Space - circulation path leading from the lane in back of the complex, and two paths leading from apartments.
- Surfacing - artifical grassmat.
- # of children using Big Toy - during the 7 visits to the site, 2 boys and three girls used the Big Toy on one occasion only.

- Ages of Children - 8 year old boy, 11 year old boy, and the girls were between 10 and 11 years old

D OBSERVATIONS

The entire garage roof deck, it was observed, was being used as a play facility moreso than the Big Toy structure itself. Children ranging from 4 years to 12 years of age were observed playing in different areas of the garage roof deck and entertaining different activities. During one site visit, two girls, ages 4 years and 8 years old were sitting quietly on a bench colouring. On one occasion, a boy aged 4, was riding his tricycle around the planters and throughout the roof deck area. Another site visit found two girls, aged 10 and 11 constructing a fort from large pieces of board near the back lane close to the abutting building. The remainder of the visits reported no play activity.

E RESIDENTS RESPONSE

The children, as well as some adults,

expressed their opinions regarding the success of garage roof deck play space. The children, firstly, complained of a lack of space in which to create or indulge in play activities. They stated that the play space itself was just too small and consequently they became bored and found more entertainment in initiating games, such as tag and riding bikes, throughout the garage roof deck. They said that the Big Toy structure was too big for the smaller children to play on and only children from 5 years old to 11 years old played on the Big Toy. There is no provision for play for the smaller children. The children stated that they would rather have a large open space where they could create their own play rather than having the Big Toy structure. They complained that the stucco plaster finish of the walls surrounding the play space caused scrapes and scratches when they jumped off the Big Toy and bumped into the walls. In general, they use this area as a meeting place and usually they meet about eight o'clock at night when games of tag and hide and seek are initiated.

The adults, living within 2 meters of the play space, complained that the drainage area beneath the Big Toy structure is inefficient. During heavy rains the grass mat groundcover retains water and, consequently, children's shoes are soaked when they jump from the Big Toy to the ground. Water collects to such an extent that it floods apartments which are closest to the play space. See Photograph #2.

PHOTOGRAPH #2 - Shows proximity of play space to apartments

The adults of the apartment complex also voiced their opinion that provision for adult supervision was necessary. The fact that the children use the entire garage roof deck as a play space creates much disturbance and noise, especially in the evening, and the caretaker living on the premises chases the children away and has even telephoned the police on a few occasions.

III.20 Case Study #2

A LOCATION 1528 Comox Street, Vancouver, B.C.

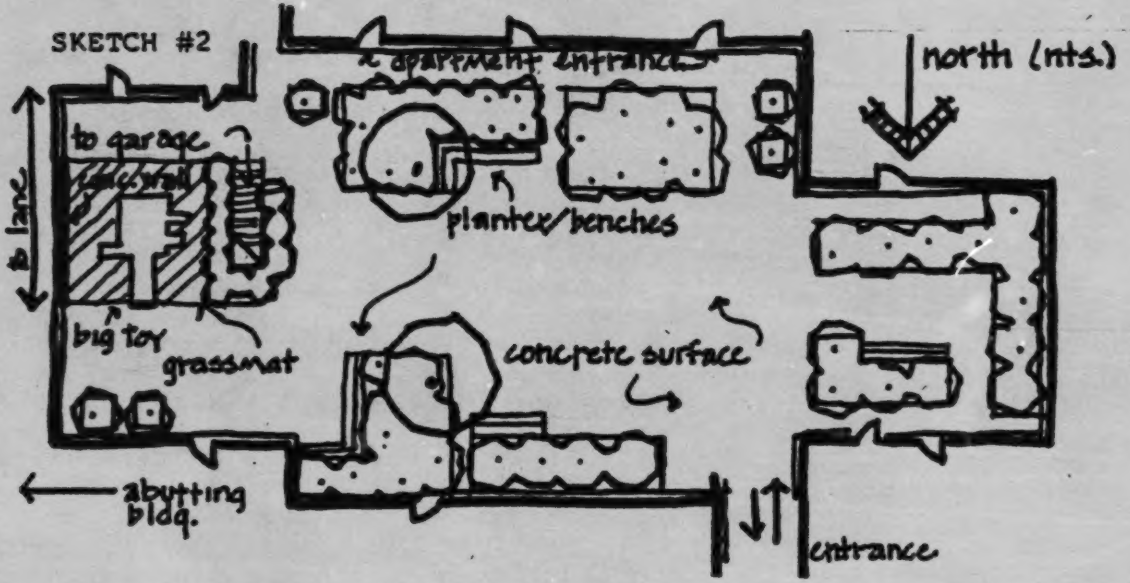
B ROOF DECK CHARACTERISTICS

•Deck Type	- garage roof deck
•Height above Grade	- on grade, with parking underground
•Type of Bldg.	- residential apartment complex
•# of storeys	- 2 storey apartment complex
•# of units	- 30 units
•Surfacing	- concrete slab
•Containment	- contained by building on two sides & a concrete wall behind children's play space separating it from abutting building
•Access	- access to garage roof deck from first floor apartments is directly at grade. Access from the second floor is by balconies and stairs. There are two accesses from the street, one in front of the complex and one from the back lane behind the complex. All apartments face inward onto the garage roof deck.
•Special Characteristics	The layout of the garage roof deck is much the same as that in Case study #1. However, the planters in the middle of the roof deck area are absent which pleases the children because there is much more room to ride

bikes, run and play. See Sketch #2:

Total deck Area: 434 square meters

SKETCH #2


2 apartment entrances
north (nts.)
to garage
conc. wall
to lane
planter/benches
big toy
grassmat
concrete surface
abutting bldg.
entrance

C PLAY SPACE CHARACTERISTICS

- # of children on premises - 30 children
- Size of area - 78 square meters
- Type of equipment - one Big Toy structure with tire swing
- Type of Play - physical, creative, and social
- Accessibility to Play Space - circulation path leading from the lane in back of the complex, and two paths leading from apartments
- # of children using Big Toy - two to four children during 3 of the 6 visits to the site.
- Ages of Children - Ages ranged between 5 years of age to 11. However, during one visit, a 2 year old girl was swinging on the tire with the support of her sister.

D OBSERVATIONS

This garage roof deck is used more by the children than in Case study #1. Perhaps this is caused by the caretaker chasing the children away from 1424 Comox Street. Children were observed playing during all six visits to this site. Always there were children playing with trucks, riding tricycles or playing on the overhead balconies. Generally, it was much more active than its duplicate in Case study #1. The back wall separating the play space from the abutting building gives a feeling of enclosure to the play space. This might enhance the feeling that the play space belongs to the children themselves.

E RESIDENTS RESPONSE

Children of this residence and their visiting friends stated that they enjoyed this Big Toy structure, but desired more variation in the equipment in that they would enjoy a slide and a sand box. They complained, as in Case study #1, of a lack of space and the fact that small children are at a loss for activities.

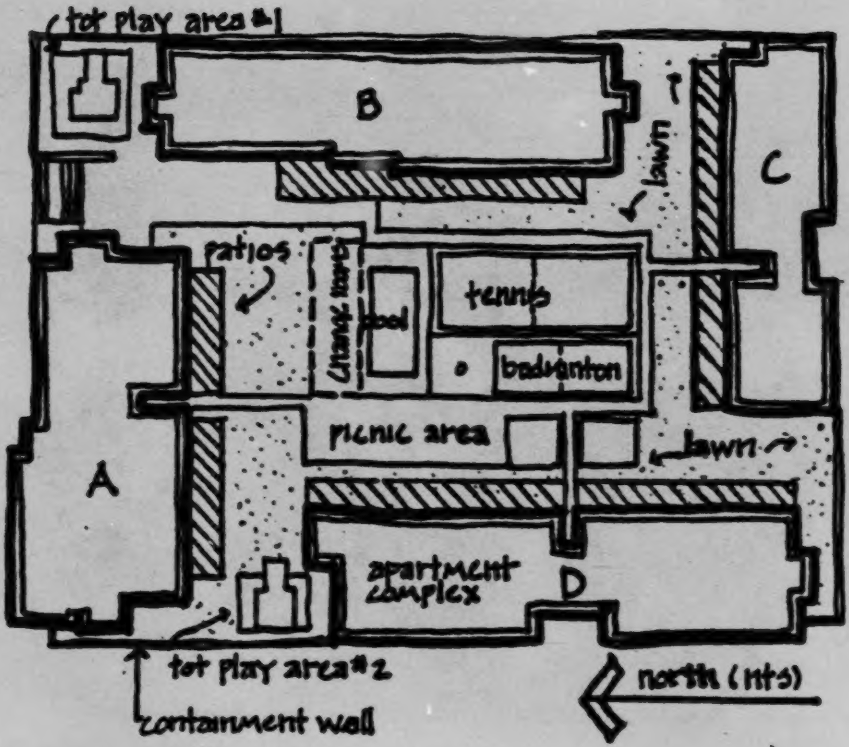
The resident whose apartment is within equal distance to the play space as that of Case study #1, had no complaints of noise, drainage problems, or mud at the front door. The back 1 meter wall separates the play space from earth which borders this property from the next. This conceivably keeps mud out of the play space where it could clog the drain beneath the Big Toy structure, and allows the area to be kept cleaner.

III.30 Case Study #3

A LOCATION Dolphin I development, Richmond, B.C.

B ROOF DECK CHARACTERISTICS

- Deck Type - garage roof deck
- Height above Grade - 5 meters
- Type of Bldg. - 4 building apartment complex
- # of storeys - 3 storeys
- # of units - 174 units
- Surfacing - concrete pad
- containment - contained by building for the most part and a 1 meter high concrete wall where building does not surround the garage roof deck
- Access - by a set of stairs at the front of the building and from apartments which face onto the garage roof deck at that level
- Special Characteristics There is a double paddle tennis court, a swimming pool, outdoor seating and picnic area and two separate play spaces. See sketch #3.


tot play area #1
B
lawn
C
patios
change rooms
pool
tennis
badminton
picnic area
lawn
A
apartment complex
D
tot play area #2
containment wall
north (nts)

SKETCH #3 - Showing relationship of play areas to other activities on garage roof deck

C PLAY SPACE CHARACTERISTICS

.# of children on premises - no children are residing in this complex as it is an adult building only. However, visitors often include children.

.Size of each play space - Tot play area #1 - 80 square meters

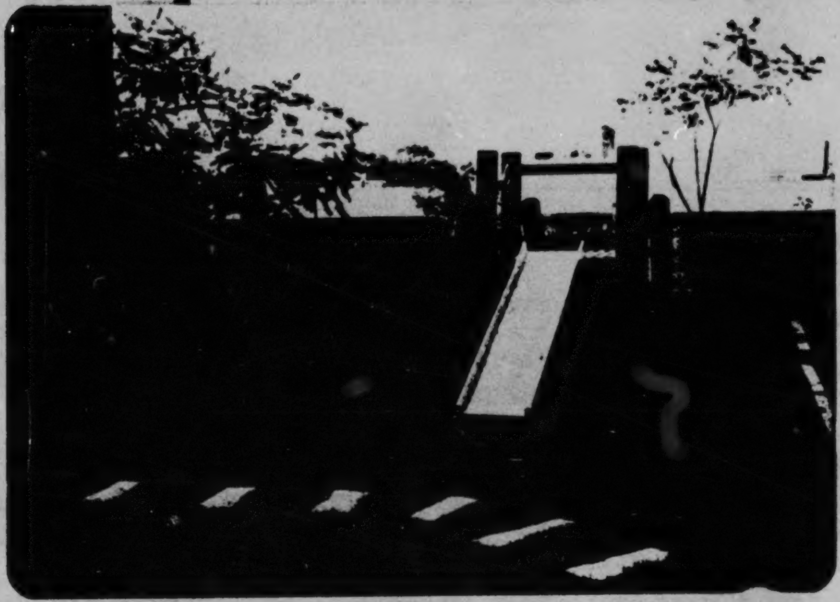
- Tot play area #2 - 53 square meters

.Type of equipment - 1 Big Toy structure in each play area with a sand base. See Photograph #3 &4.

.Type of play - physical and creative

3 - Showing Big Toy Structure on sand base retained by treated wood timbers.

REA #1



REA # 2

•Accessibility to Play Space	- circulation paths leading from stairs at grade level and from the common area on the garage roof deck
•Surfacing	- sand contained by 10 cm x 10 cm wooden treated timbers
•# of children using Big Toy	- none

D . OBSERVATIONS

The two play spaces, Tot Play Area #1 and #2, are very separate from one another and very separate from any activities taking place on the roof deck. They are, in fact, tucked away from adult activities or supervision. See Photograph # 5.

PHOTOGRAPH #5 - Showing alienating quality of play space

It was observed during the 8 visits to this site, that adults used the tennis and pool areas, yet children were not seen in the play spaces.

E RESIDENTS RESPONSE

Provision for adult supervision was a complaint expressed for both play areas. Residents who have young children visiting them, ages between 3 and 4 years old, are unable to supervise these children, and they stated that traditional swings and slides for these younger children would be more appropriate than the Big Toy structure for reasons of safety.. The caretaker of the building stated that the younger children have no place to play as the Big Toy structures are just too big for small children.

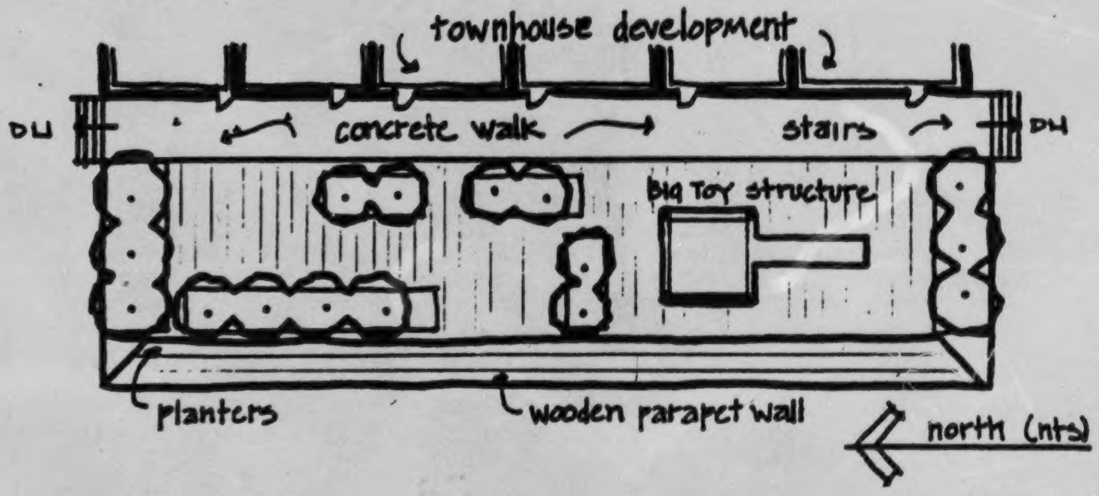
III.40 Case Study #4

A LOCATION False Creek, Vancouver, B.C.

B ROOF DECK CHARACTERISTICS

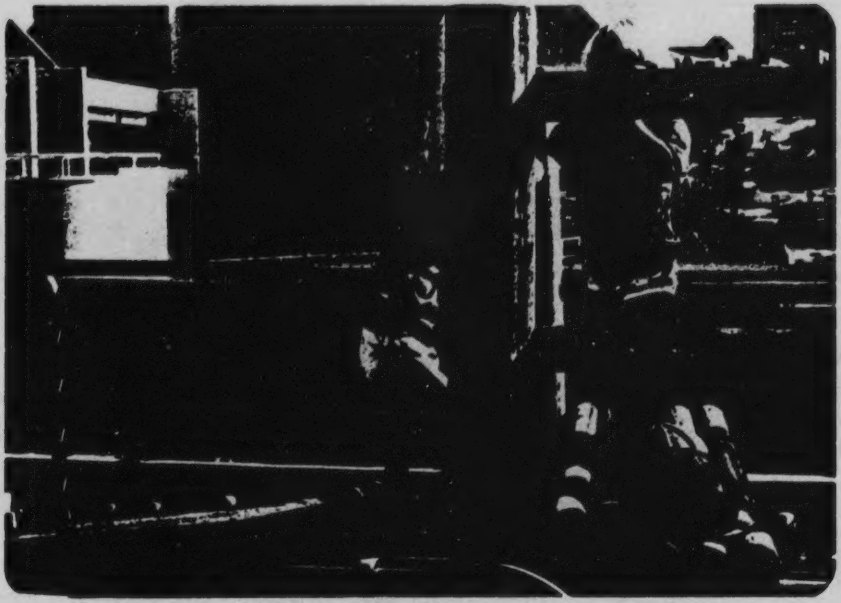
.Deck Type	- garage roof deck
.Height above Grade	- 3 meters
.Type of Bldg.	- Clustered townhouse development
.# of storeys	- 2 storey townhouses
.# of units	- 8 units
.Surfacing	- wood decking with parking below
.Containment	- 1 meter wooden fence with overhang See Photograph #6
.Access	- from individual houses and two sets of stairs at either end of the deck
.Special Characteristics	This deck is used by residences as a seating area and provides immediate surveillance to play space. See sketch #4.

SKETCH #4


townhouse development
DN
concrete walk
stairs
DN
Big Toy structure
planters
wooden parapet wall
north (nts)

C PLAY SPACE CHARACTERISTICS

- # of children on premises - 8 children
- Size of Area - children use the total deck: 190 square meters
- Type of equipment - a small Big Toy structure designed specifically for a roof deck in that it is not as high as the usual Big Toy structure.
- Type of Play - physical, creative, social and quiet/retreat
- Accessibility to Play Space - deck is directly outside units; from grade there are two sets of stairs, one at either end of the roof deck
- # of children using Big Toy - 2 children
- Ages of Children - a boy 2 years old and a girl 4 years old



PHOTOGRAPH #6 - Showing wooden parapet wall with overhang

D OBSERVATIONS

It was observed during the three visits to this site, that during one particular visit, the Big Toy was thoroughly enjoyed by the children using it and the mothers who could watch their children from their front doors.

E RESIDENTS RESPONSE

This play space was designed specifically for younger children within the ages of 2 to 4 years of age. It was stated by the residents of the units, that it was very successful because it kept the younger children occupied near the home where mothers could keep an eye on their children. The younger children used the equipment to develop motor skills of coordination and climbing. See Photograph #7. The older children, aged 5 years to 8 years of age occasionally used the equipment creatively by making tents around the wooden poles and staging shows. For the most part, the older children visited the playground in the neighbourhood.

PHOTOGRAPH #7 - Showing younger children climbing on Big Toy structure

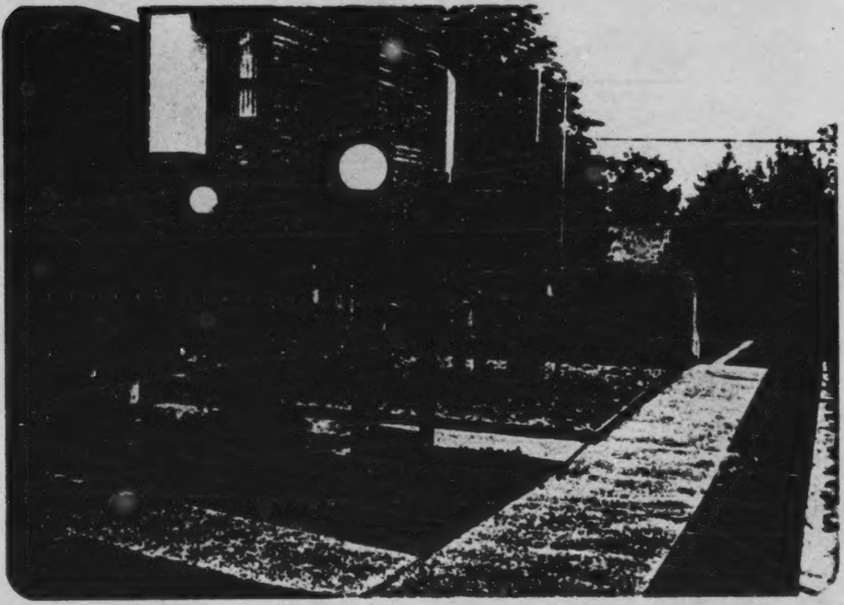
III. 50' Further Examples

The following two examples are much like those of Case Study #1 and #2, Comox Street, Vancouver, B.C. They are garage roof decks, as in Case Study #1 and #2, are at grade.

A LOCATION W. 14th Street, North Vancouver, B.C.

PHOTOGRAPH #8 - Showing climbing structure above parking garage with surrounding parapet wall

PHOTOGRAPH #9 - Showing opposite side of climbing structure on a retained sand base.

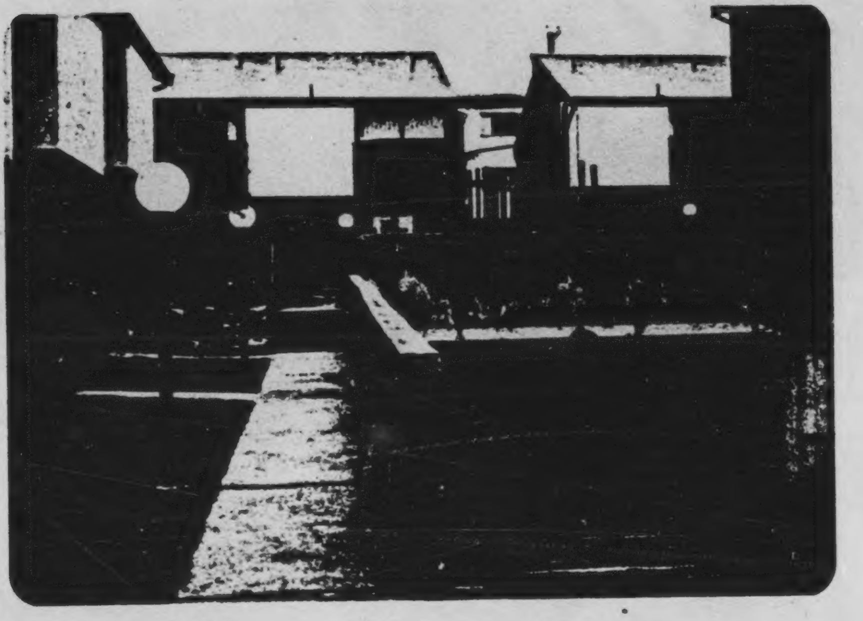


PHOTOGRAPH #10 - Showing climbing structure with screening from houses.

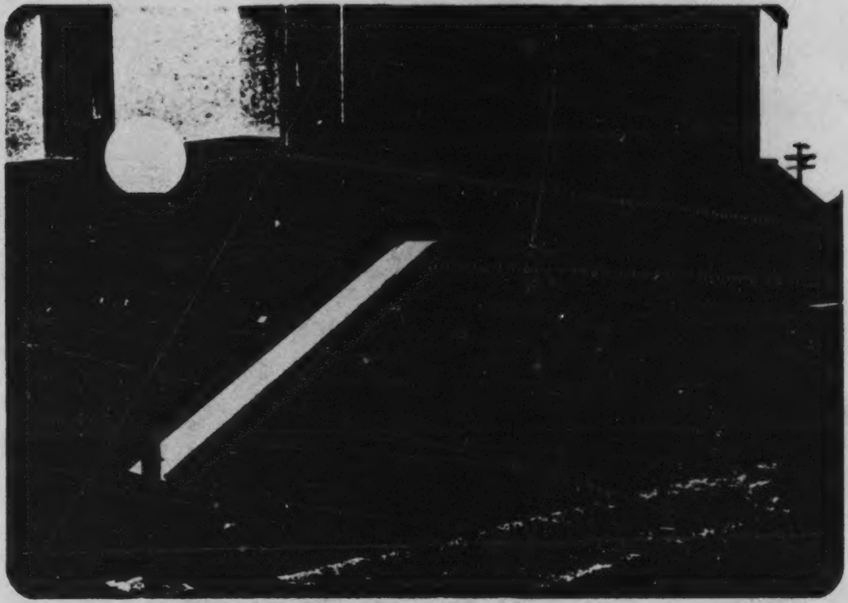
B LOCATION East 11th Street, North Vancouver, B.C.

The example of a garage roof deck at East 11th Street, North Vancouver, B.C. is very similar to that of the garage roof deck at West 14th Street.

PHOTOGRAPH #11 - Showing climbing structure at grade with housing and above garage, with surrounding concrete parapet wall.



PHOTOGRAPH #12 - Showing opposite side of climbing structure with retained sand base.



III.60 Summary

There are a number of points which through study of the existing roof deck play spaces shed light on many of the problems and benefits incurred with this type of planning. A summary of these points is listed below:

1. Minimum space standards and equipment standards lead to various grievances. Firstly, the children become bored in small spaces and, consequently, turn to the larger area of the roof deck to play. This results in disturbances to residents of the complex. It was stated by the children of Case Study #1 and #2 that they desired more variety in play equipment and more room with which to create and innovate their own games.

2. The siting of equipment can be a critical factor for surveillance of the children by parents and noisy play close to apartments. In Case Study #1 and #2, the siting of the play equipment, just 2 meters from two apartments, caused problems to these residents. In Case Study #4, however, the proximity of the equipment to the residences was desirable for parental supervision of the younger children of the complex. The siting of play equipment

as exemplified in Case Study #3 depicted a problem in that the play space and equipment was very separate from any of the other activities on the roof deck and children, therefore, would feel alienated from adults and parents.

3. In most examples of roof deck play spaces mentioned in this section, except Case Study #4, provision for adult supervision was lacking.
4. Technically, there were problems observed such as drainage and anchoring, at the existing roof deck play spaces. Orientation, depicted in Case Study #1 and #2, resulted in the play space at each location being totally shaded all afternoon. As well, surface materials were found to be inefficient and were saturated with water. Wood decking, seen at Case Study #4, and sand, at Case Study #3, were observed to be suitable groundcovers.

The observations summarized above are of extreme value to designers who, for the first time, are approaching the development of a roof deck for play. Consequently, the benefits and drawbacks of existing roof deck play space examples begin to form a foundation for guidelines for future undertakings of this nature.

The observations and conclusions elicited from existing roof deck play spaces begin to answer the questions stated in the introduction of this report. For example, 'what would a roof deck play space be taking advantage of as far as the child is concerned?' Case Study #4 answers this question by pointing out that children have a place to play close to the familiar territory of their home when at the preschool age they are unable to leave the vicinity unaccompanied by a parent or adult.

In summary, given resolutions to technical and design problems, the roof deck play space will be an exciting and functional solution to the need for space for children's playgrounds in the urban residential community.

IV RECOMMENDATIONS FROM PRACTITIONERS AND ON-GOING RESEARCH

There is little actual research documentation of roof decks used as children's play spaces, and generally is mentioned in texts in terms of a consideration only. However, cities throughout Canada, (Montreal, Ottawa, Halifax and Toronto), have studied and are presently developing the potential of roof deck play spaces. The following institutions referred to below and who were contacted during the preparation of this report, explain some of the concerns which they incurred with the development of roof deck play spaces and recommend alternatives to the problems experienced. Included in the Appendix of the report is the correspondence which fully describes the success of these projects to date.

1. The Children's Hospital of Eastern Ontario, Ottawa. The roof deck play space at this institution has been in existence for five years. It is approximately 12 meters by 22 meters and is located directly off the preschool unit. The cedar deck flooring is suitable for drainage and for patients in wheelchairs, but it is pointed out that it is not suitable for patients with intravenous tubes. There is a canopy with indoor/outdoor carpeting in an area of 5 meters by 4 meters. Activities such as vegetable planting, picnicing, and play in the sandbox take place on the roof

deck play space.

The major concern described in this example had been leakage through the play space roof deck to the floor below. Repair was possible only by the destruction of the cedar deck. It was suggested that, in future, sectioning the cedar deck floor would allow access to the problem with less destruction and more efficient use of time and labour.

2. The University of Western Ontario, London. The roof deck play space developed at this institution is an adventure play roof-garden. It contains in an area of approximately 386 square meters a large building area including a frame house, boards, building blocks and pulleys, as well as a carpentry centre. In addition, there is a sandbox with an associated waterplay area, an extensive tricycle track and a gymnastics area with apparatus such as hang bars, rope bridges and ladders. Refer to sketch located in the Appendix of this report.

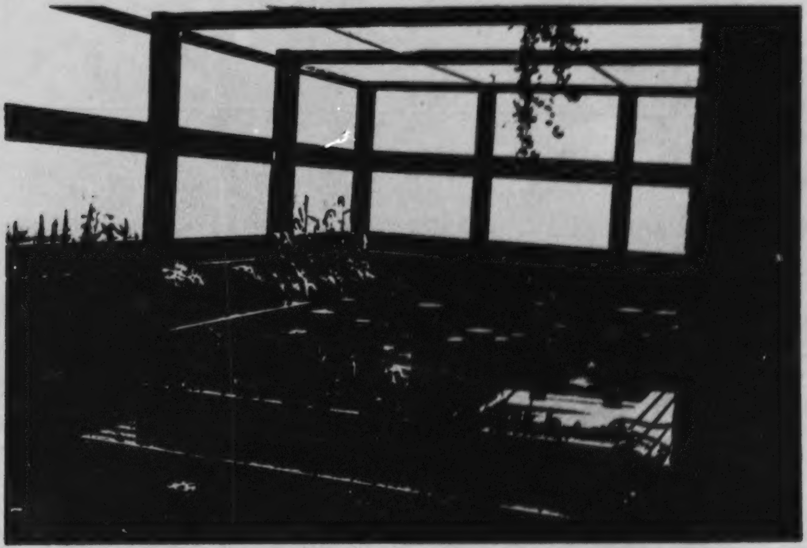
Overcoming the problems with wind velocity and safety on the three storey roof deck were the major concerns of the instituion and its architects. A five storey section of the building above the play area protects the play space from prevailing winds and allows the children to use the space for play throughout all seasons. As a safety element, to discourage children from climbing over the parapet walls, the fence was designed with an overhang which makes it impossible to climb over the fence. Additionally, the incorporation of meshing and cracks in the parapet walls for children to see through eliminates their curiosity and their desires to climb over the fence.

Fortunately, through this example possibilities for winter activities have been introduced. Winter equipment is replaced by summer equipment in such forms as sleighs and toboggans in the areas where tricycles and wagons are used.

Technical problems experienced on the roof deck play space have led to some recommendations for consideration for future roof deck developments. Most importantly, weight of sand used for sand boxes or groundcover and plant material must be realized. Secondly, drainage for these and other elements of the roof deck must be large enough to prevent clogging by materials and debris. And, thirdly, protection from the sun is vital for both the comfort of the users and the materials necessary for play equipment, surfacing, and landscaping.

3. The Montreal Children's Hospital, Quebec.

This 8 storey roof deck play space, approximately 372 square meters, has been in existence for 15 years in a highly urbanized setting. The roof deck play space is oriented to the south with a surrounding wall 1 meter high of wood and brick. Above this a 2 meter wind barrier of lexan glass framed with wood provides children with a play space on bad days and views from the roof deck. See Photograph # 13 below:



PHOTOGRAPH #13 - Showing the design and structure of the parapet wall.

The surface of the roof deck play space is Chevron's Dry Turf (green) and was reported to be holding up reasonably well.

Activities in the play area include both wet and dry sand boxes, sand table for wheelchair children, crawling tunnels and tubes, tether balls hung at different heights, retractable table and easel, log climbing clusters, a large slide and a giant bean bag pile. See Photograph #14 and #15 in which children at at play.

PHOTOGRAPHS #14 & #15 - Showing children at play on roof deck at The Montreal Children's Hospital.

4. City Planning Department, Vancouver, B.C.

The City Planning Department of the City of Vancouver did a cost estimate study of the costs entailed for load capacity accommodation of top soil and hard surfaces for play for 3-storey apartment roof deck play spaces. It was conclusive from the study that it was not a realistic option in view of the Central Mortgage and Housing Corporation's maximum house prices. Beyond this, the study showed that in terms of cost, security and useability, playgrounds related to parks was a more worthwhile project.

IV.10 Summary

The research conducted in this section of the report is very interesting in terms of what types of roof deck play spaces exist in Canada, what types of activities take place and what can be learned for future planning of roof deck play spaces.

The following is a summary of the considerations which have been suggested through these examples for planning roof deck play spaces:

1. Surfacing - the factors related to this element are: durability, drainage, and that people with handicaps are not hindered by the nature of the flooring;
2. Leakage - any type of leakage on the

roof deck causes damage to the floor beneath. Therefore, it is important that if such problems do occur that accessibility to the problem area be easy so that children's play is not interrupted for an extended period of time;

3. Safety - it is important to discourage children from climbing over the parapet walls. This may be accomplished by constructing a high parapet wall as shown in Photograph #13 or, with the use of an overhang, or, allowing children to view through the parapet walls in order to satisfy their curiosity about what is taking place on the other side of the wall;
4. Winds - so that play can be extended on the roof deck throughout all seasons, protection from the prevailing winds is necessary. If possible, as shown in example #1, the higher section of the building should be constructed so that it blocks the direction of the winds. If prevailing winds are a problem after the time of construction, higher walls may be the necessary solution;

5. Weight - suggestions related to this element were pointed out in example #2. The necessary requirements in a children's play space such as sand, play equipment, and landscaping, must be realized as weight bearing factors;
6. Drainage - must be large enough systems to prevent clogging from debris and materials used on the roof deck play space;
7. Storage - accommodation for storage of play equipment was reported necessary for most of the examples of existing roof deck play spaces;
8. Sun protection - in most cases, the roof deck is an area which attains a great amount of exposure to the sun and consideration for protection is necessary for the children as well as the materials used in the play space;
9. Costs - the resolution to the considerations mentioned in this section may result in costs which are beyond the means of a pre-determined budget. Therefore, if possible, play space may have to be sought at grade or innovative design and engineering of play elements and materials may help solve the problem.

V GENERAL SUGGESTIONS

Based on the case studies of Section III and Section IV, suggestions for the design and technical aspects of roof deck play space development are presented here under two categories. The first is General Suggestions and the second is Play Suggestions.

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Space	• integrate activities indoors and outdoors • incorporate level changes to suggest the presence of more space • incorporate mechanical features (chimneys, etc) into play equipment
• Access	• make as many accesses to roof deck available to residents and friends of residents with consideration to the handicapped; wheelchairs, canes, baby-carriages, the elderly, etc.
• Social Integration	• integrate activities for parents/ adults and elderly and handicapped as much as possible • select activities which inspire communal relationships to occur

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Social Integration	• select activities which inspire communication within families to occur, as well occupants of building
• Confinement	• allow views through parapet walls to surrounding landscape features • use only unbreakable glass (lexan or reinforced) in the parapet wall • integrate parapet walls into the total design of roof deck by using textures, shapes, and/or colours instead of allowing walls to overwhelm the entire roof deck space
• Vertigo; dizziness	• set glass parapet walls 60 - 70 centimeters back from the edge of the roof deck to reduce vertigo • parapet walls should be a minimum of 1.5 meters and a maximum of 2 - 2.5 meters to provide a feeling of security for roof deck users
• Weight	• light weight materials are now available for soil mixtures, concrete mixtures, and light weight

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
	surfacing materials.[5] • elements which have high weight bearing capacities must be placed over supporting structural members. (Refer to Roof Decks Design Guidelines. CMHC. NHA 5220 79/01)
• Height	• plant materials and equipment over 2.5 meters should not be utilized on the roof deck due to their instability in strong winds
• Inclimate conditions	• at least one quarter (1/4) of the roof deck should be rain-proof • shadow: if possible, prior to construction, the roof deck should be oriented south or southwest. • the southern portion of the parapet wall should be glass (lexan or reinforced) to allow roof deck some sunlight and warmth during winter months. Light coloured plant materials and surfacing would be helpful in shady areas • barriers are necessary to obstruct

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
	prevailing winds, by using a higher parapet wall on wind side or, if possible, constructing a section of the building above roof deck on wind side
	• it would be convenient to have some lighting after dark
• Drainage	• all surfaces must be well drained to prevent leakage onto floor beneath the roof deck as well as for the comfort of the users on the deck. Drains must be large enough so that clogging does not occur. Materials such as sand must be well contained.
	• wood decking - drains well
	• artificial grass mats - tends to retain water during heavier rains and freezes in winter
	• Further information regarding drainage systems CMHC. NHA 5220 79/01.

VI PLAY SUGGESTIONS

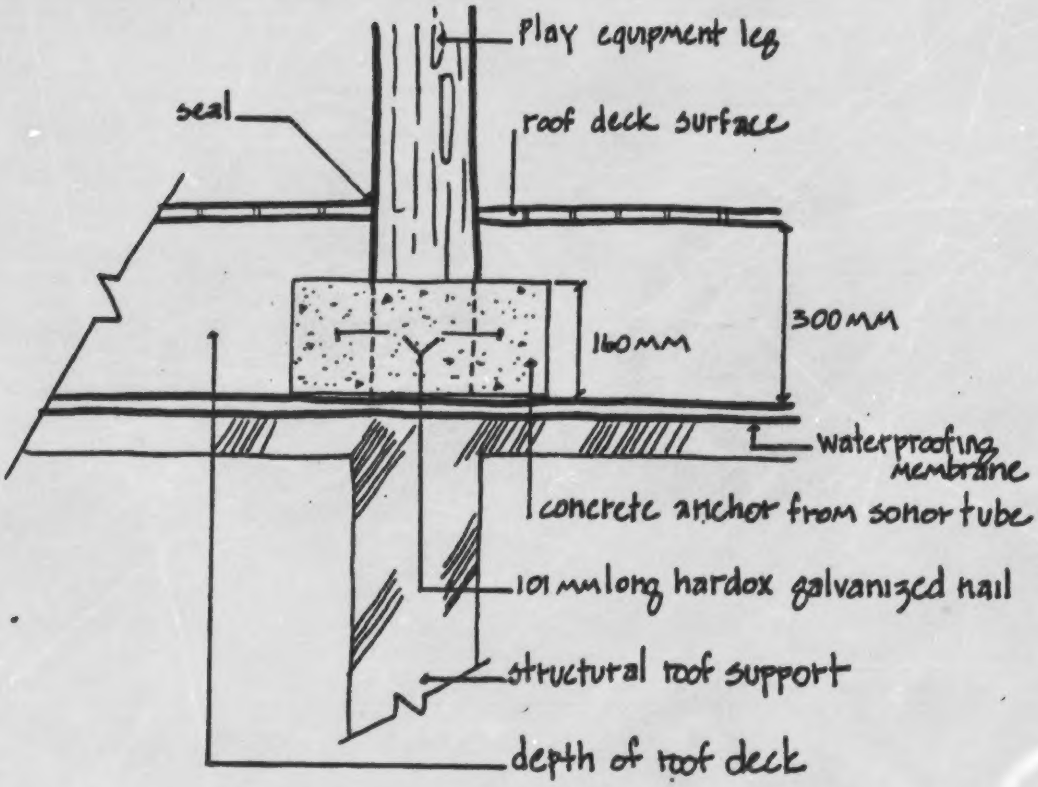
CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Space	• use all available space, including parapet walls and structural features, (chimneys, and mechanical facilities), as part of play equipment • include as many different activities and types of equipment as possible
• Scale	• reduce super human scale of adjacent buildings and height above the ground by incorporating scale and sensations close to the ground with plant materials and play equipment
• Safety	• keep higher play equipment near the center of the roof deck • use flexible surfacing beneath all pieces of equipment to soften impact • all equipment must be competently anchored • use non-slip surfacing materials • discourage climbing and prevent loose materials from being thrown over parapet walls through design by curving walls inward

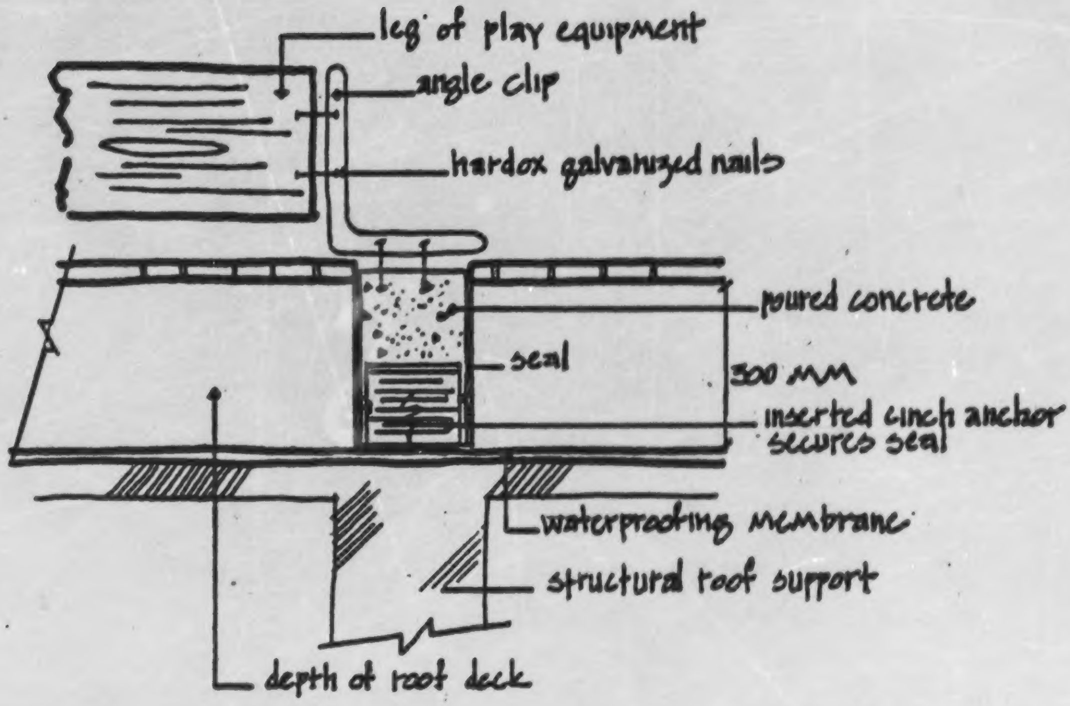
CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
•Surveillance	• encourage parents/adults to participate in activities on roof deck by providing seating and sports • locate play space in a near central location on the garage roof deck
• Noise	• site passive play area close to apartments facing onto roof deck play space • limit size of play equipment in areas closest to apartments in order to keep the number of children in one area to a minimum
• Surfaces	• offer where possible, large flat surfaces for children to initiate games • utilize different patterns in materials to create interest and help define areas • mark out tricycle paths, and circulation paths • flexible surfaces beneath play equipment should be 4 centimeters thick of rubber, sand or wood decking

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Surfaces	• use non-glare surfacing on highly exposed sun areas • concrete footings for equipment must be below platform deck
• Monotony	• incorporate different and varied play equipment and activities for different age groups • incorporate changes in levels on the roof deck allowing views from different vantage points • allow exploration into all areas of the roof deck experience
• Parapet wall	• to help alleviate feelings of enclosure, design play into the functional use of the parapet wall by incorporating peg games, views, and manipulative objects into wall • unusual shapes, textures and colours will add to the total experience of the roof deck play space
• Inclimate conditions	• wind velocity - could be used as a learning and visual experience

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Inclimate conditions	• for children by facilitating wind mills, banners and kites as well as noise sensations • offer canopies in a small area for play on rainy days; retractable from wall in case of strong winds • sun exposure: - offer garden boxes, (some elevated for handicapped persons), water relief (pools or spray), trellised section, area for sunbathers, etc. • snow: - maintain areas for piling snow, away from parapet walls, where children can make sculptures and build forts • flexibility for winter sports and activities
• Anchoring Play equipment	• prevent damaging waterproofing membrane when anchoring equipment • swing components of some climbing equipment causes anchoring to become loose through the action of momentum • See Sketch # 5 - Method of anchoring equipment at the time of construction

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Anchoring play equipment	SKETCH #5 - Approximately 45-60 kilograms of stabilizing concrete from sonor tube


Play equipment leg
seal
roof deck surface
160MM
300MM
waterproofing membrane
concrete anchor from sonor tube
101 mm long hardox galvanized nail
structural roof support
depth of roof deck


leg of play equipment
angle clip
hardox galvanized nails
poured concrete
seal
300 MM
inserted cinch anchor secures seal
waterproofing membrane
structural roof support
depth of roof deck

SKETCH #6 - Method of anchoring play equipment following construction, preventing damage to waterproofing membrane

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Height of play Equipment	• reverse trend of high play climbing equipment to lower and wider pieces of equipment. Squat equipment is more stable and is adviseable for children's safety on roof decks
• Natural Elements	• use as much earth, plant material, rocks, water and natural materials as possible for: a) aesthetics - viewing roof deck from higher storeys surrounding the area; b) to define areas and screen between apartments and play space c) to provide interest and create an environment which feels secure and familiar;
• Storage	• storage area is necessary for an adventure roof deck play space and for such as equipment as gardening tools, etc. • consider using as part of play equipment; climbing, tunnels

CONSTRAINT ELEMENT	DESIGN/TECHNICAL SUGGESTIONS
• Supervision	• integrate children's activities and parents/adults activities, i.e. pools, volleyball • offer opportunities for social interaction between adults of residence
•Variety of Play Experiences	• create as many play experiences as possible for all ages of children (preschoolers, children aged 6 to 12, teenagers) as well as adults • incorporate adult and child activities, such as sports or building areas in which the family can participate • use different levels and different types of areas within the roof deck in order to generate movement and experience throughout the entire roof deck space

VII PROBLEM SOLVING ALTERNATIVES

In summary, based on the preceeding sections, development of a roof deck play space is characterized by conditions of constraint, including weight, climate, safety and costs. These oppose the conditions of desirability, namely the provision of a place to play where there may be no other alternative; the provision of privacy; good sun exposure and separation from street commotion and traffic dangers. Overcoming the difficulties in design and technical aspects is a real challenge in the planning of roof deck play space which incorporates different facets of play, (social, cognitive, creative, physical, quiet/retreat) for different aged children and adults.

Finding solutions requires well thought out and professional planning. The example below, Sketch #7, has been developed hypothetically in order to demonstrate a conceivable site plan for a roof deck play space. One of the notions it has been based upon is that of the roof deck being thought of as an 'outdoor room'. Instead of locating the play area on the roof itself, the roof in this case has been removed. The walls, therefore, remain and act as the parapet wall, but with an even greater measure of safety. The direct relationship to the outside is still an attractive impetus for play. Secondly, the design of the activities taking place in the play space has been totally created upon the notion of a learning experience.

for children in terms of the natural elements such as winds, sun, rain, vegetation and fresh air. This is a beneficial feature for people living in heavily populated urban situations where there is little to experience in the way of a natural environment. The activities in this example are devised to remind children that they are in an outdoor situation and to demonstrate and provoke interest in the natural elements surrounding them. Some of these activities are; collecting water from the rainspout and allowing it to flow across the deck to the drain; and showing wind velocity and direction by providing an adjustable sail on a moveable base which the children can manipulate themselves. The range of possibilities for activities on the roof deck are as great if not moreso than on the ground. Innovative solutions for design and technical constraints are the key to designing the roof deck play space. Designing with the child in mind and providing a play space in which a child may participate, manipulate, make choices and enjoy a complexity of experiences will bring forth a well used play space.[6]

See Sketches #7 and #9 for examples of possible roof deck play spaces in residential complexes.

SKETCH #7 - A POSSIBLE PLAY SPACE IN AN "OUTDOOR ROOM"

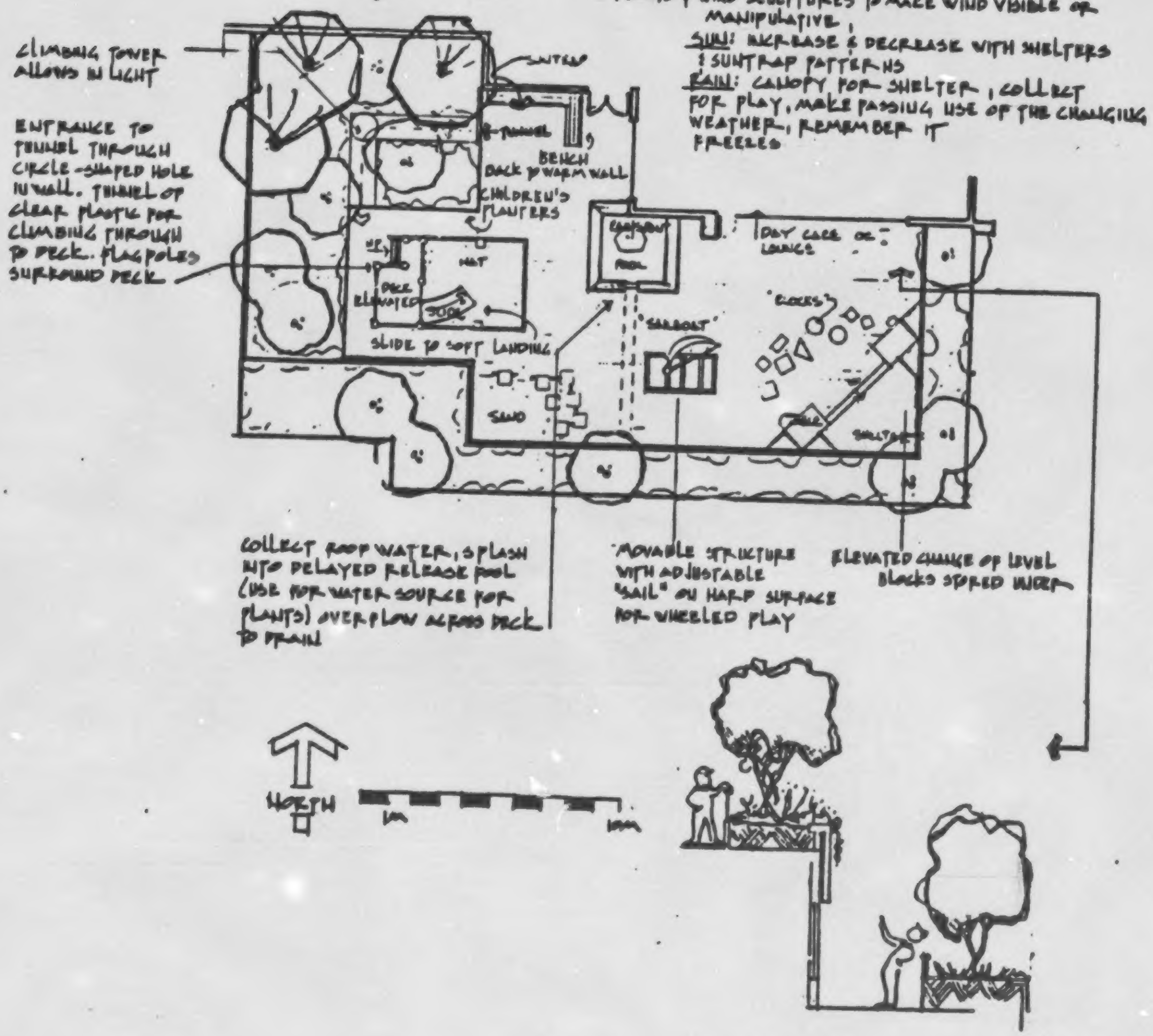
PLANTING TO INCLUDE FLEXIBLE, FINE & COARSE TEXTURE, WIND TOLERANT MATERIAL

SOME OF THE NATURAL ELEMENTS ARE MORE INFLUENTIAL THAN OTHERS ON A ROOF DECK. DEVELOPMENT OF ROOF DECK PLAY SPACES SHOULD REFLECT THIS AND EMPHASIZE THOSE FORCES

WIND: FLAGS, BANNERS, WINDMILLS TO PUMP WATER, PLANTS & WIND SCULPTURES TO MAKE WIND VISIBLE OR MANIPULATIVE,

SUN: INCREASE & DECREASE WITH SHELTERS & SUNTRAP PATTERNS

RAIN: CANOPY FOR SHELTER, COLLECT FOR PLAY, MAKE PASSING USE OF THE CHANGING WEATHER, REMEMBER IT FREEZES


SUNTRAP
TUNNEL
BENCH
BACK TO WARM WALL
CHILDREN'S PLANTERS
DECK ELEVATED
MAT
SLIDE
SLIDE TO SOFT LANDING
SAND
CANOPY
POOL
DAY CARE OR LOUNGE
"BLOCKS"
"SAILBOAT"
SHELTER
NORTH
1m
10m

CLIMBING TOWER ALLOWS IN LIGHT

ENTRANCE TO TUNNEL THROUGH CIRCLE-SHAPED HOLE IN WALL. TUNNEL OF CLEAR PLASTIC FOR CLIMBING THROUGH TO DECK. FLAGPOLES SURROUND DECK

COLLECT ROOF WATER, SPLASH INTO DELAYED RELEASE POOL (USE FOR WATER SOURCE FOR PLANTS) OVERFLOW ACROSS DECK TO DRAIN

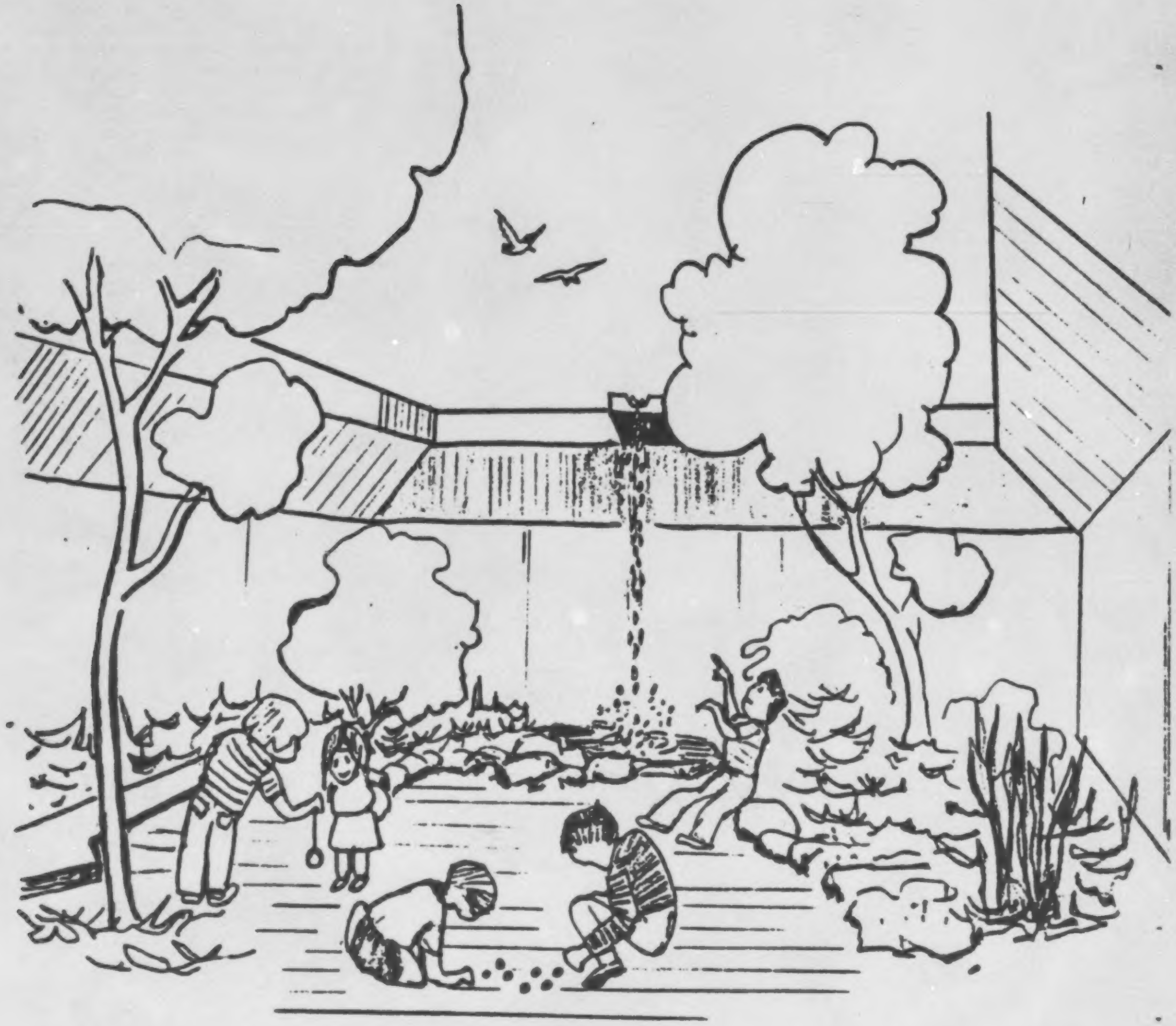
"MOVABLE STRUCTURE WITH ADJUSTABLE "SAIL" ON HARD SURFACE FOR WHEELED PLAY

ELEVATED CHANGE OF LEVEL BLOCKS STORED UNDER

SECTION THROUGH BLDG SHOWING PARAPET WALL

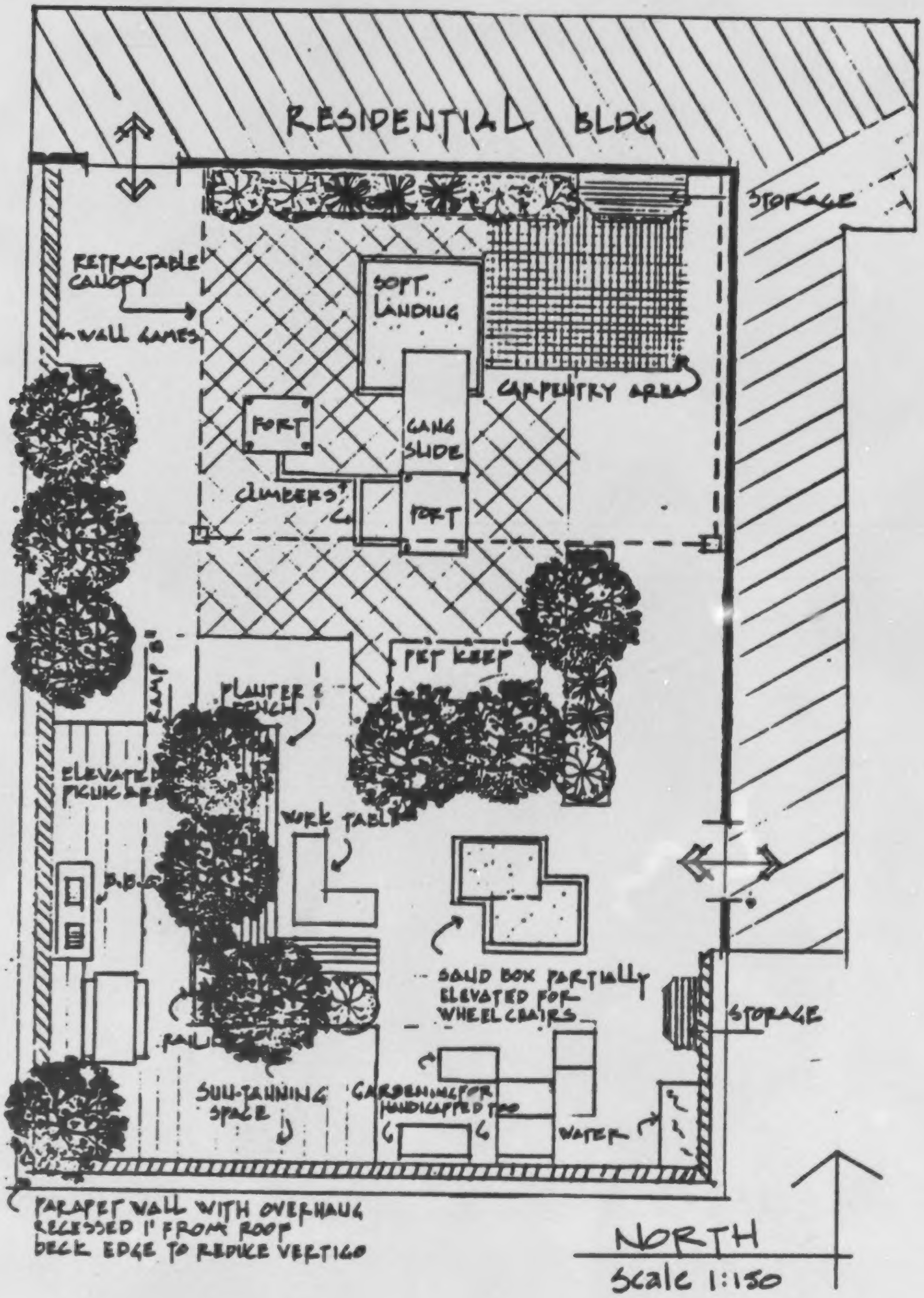
SKETCH #8

PLAN WITH ARCHITECT TO OMIT
A ROOF CREATING AN "OUTDOOR
ROOM" IF ROOF DECK IS
UNFEASIBLE FOR ANY REASON



WITH: stone, wood, earth, plants, rain
wind sun -
& wagons, blocks, sand, water slides, boxes
All sorts of commercially available or
homemade play things

SKETCH #9 - A POSSIBLE ROOF DECK PLAY SPACE IN A RESIDENTIAL COMPLEX


RESIDENTIAL BLDG
STORAGE
RETRACTABLE CANOPY
WALL GAMES
SOFT LANDING
CARPENTRY AREA
FORT
GANG SLIDE
CLIMBERS
FORT
PET KEEP
RAMP
PLANTER & BENCH
ELEVATED PICNIC AREA
WORK TABLE
BBQ
SAND BOX PARTIALLY ELEVATED FOR WHEELCHAIRS
STORAGE
RAIL
SUN-TANNING SPACE
GARDENING FOR HANDICAPPED TOO
WATER
PARAPET WALL WITH OVERHANG RECESSED 1' FROM ROOF DECK EDGE TO REDUCE VERTIGO
NORTH
Scale 1:150

VIII CONCLUSION

As roof deck play space may be our only alternative to the current lack of space and expense of purchasing land in the urban core, there are many considerations which have to be explored, beyond the scope of this report. The development of a roofscape play space does, indeed, cover a vast scope. Briefly, it begins with awareness of the users and their preferences; coping successfully and efficiently with design and technical constraints; maximizing advantages; determining problem solving alternatives; and finally, presenting a management plan which will extend into the future, (at least five years).[7]

The questions asked in the introduction of the report have been researched and are answered. However, they are just a beginning and many more will require investigation in the future. Development of a roof deck play space is a unique task and it, therefore, requires unique approaches and flexible alternatives in design and technology.

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XI APPENDIX

Site Visit Checklist

A: General Characteristics of Roof Deck

Location: ____________________

Date: ____________________

Time of day: ____________________

Type of Bldg: High rise: ____________________

Stacked Housing: ____________________

Townhouses: ____________________

Apartment complex: ____________________

Other:

Type of roof deck:

Garage roof deck: __________

Bldg. roof deck: __________

Court roof deck: __________ # of Storeys

Other: __________ __________

B: Descriptive Characteristics

Type of access and # to roof deck: ____________________

Sun/wind orientation: ____________________

Type of containment/shelter: ____________________

Safety features: ____________________

Height above grade: ____________________

Type(s) of surfacing: ____________________

Special characteristics (i.e. variation of levels, water features, etc.): ____________________

Page 2

C: Play Area

Size: ______________________________

Relationship to Total Roof Deck Area: ______________

Type of structures/equipment: ______________

Provision for Adult Supervision: ______________

Innovative Play Opportunities Provided: ______________

Sports related activities: ________ Types: ______________

Maintenance of equipment: ______________

D: Users Characteristics

# of Children on Bldg. Premises: ______________

# of Children in play area: ______________

Age of children: ______________

# of children by age group using each facility/equipment/ play opportunity (see checklist below)

# OF CHILDREN/ AGE	TYPES OF ACTIVITIES							
	CREATIVE STRUCTURE	SWINGS, TRAD. EQUIP.	SPORTS EQUIP.	BIKE PATHS	LARGE FLAT SURFACES	BALL PLAYING	OTHER:	

Page 3

Types of play & # related to activites TYPES OF PLAY

	PHYSICAL	SOCIAL	CREATIVE	COGNITIVE	QUIET/ RETREAT

E: General Comments

Play patterns: individual or group & time spent: ________

____

Conflicts: ________________________________

Design response: ___________________________

Facility design response: (leaks, faulty equipment or mis-use of equipment ________________________

Durability of equipment: ___________________

Evaluation of Technical Aspects:

- Drainage; ______________________________
- Containment; ___________________________
- Anchoring; _____________________________
- Other; _________________________________

Page 4

Evaluation of Play Area for Children: ______________________

____

____.

APPENDIX # 2

Site Visit Observations

PLAY AREA LOCATION: ____

(# OF CHILDREN/AGE/TIME SPENT ON EQUIPMENT)

	VISIT #: Date/Time:	VISIT #: Date/Time:
CREATIVE STRUCTURE		
TRADITIONAL EQUIP (SWINGS, SLIDES,)		
SPORTS (TENNIS...)		
BIKE, TRIKE PATHS		
LARGE FLAT SURFACES		
BALL PLAYING		
SOCIAL ACTIVITIES		
QUIET/RETREAT PLAY		
OTHERS		
COMMENTS:		
WEATHER CONDITIONS		
CONFLICTS		
FACILITY DESIGN RESPONSE		
EVALUATION		

Dan Matsushita Associates Ltd. Landscape Architects
MBCSLA CSLA 6225 YEW STREET, VANCOUVER, B.C. V6M 3Z1 TELEPHONE: 263-0128

August 14, 1979

Catherine Morrissey
The Centre for Urban & Community Studies
University of Toronto
150 St. George Street
Toronto, Ontario
M5S 1A1

Dear Ms. Morrissey:

Our firm is presently retained by Canada Mortgage and Housing Corporation to investigate the potential of roof decks for play space development. We are researching this aspect of play space with respect to surveying existing play areas on roof decks and developing general guidelines on the use of roof decks for play spaces.

Your name was given to me by Cornelia Oberlander during an interview yesterday, August 13, 1979. As Mr. Matsushita will be visiting Toronto at the end of this month, we would greatly appreciate any examples you may be able to inform us about, and/or any information you might have concerning play spaces on roof decks.

Thank you for your kind attention to this request, and we would be pleased to receive any details which you are aware of in this matter.

Sincerely yours,

Kate Davis

Katherine Davis
Landscape Architect

/kd

Children's Hospital of Eastern Ontario
Hôpital pour enfants de l'est de l'Ontario

September 25, 1979

Ms. Katherine Davis,
Landscape Architect,
Dan Matsushita Associates Ltd.,
6225 Yew Street,
Vancouver, B.C.
V6M 3Z1

Dear Ms. Davis,

In response to your letter of September 19, 1979, seeking information regarding roof deck play spaces, the following is a description of the roof deck play space at the Children's Hospital of Eastern Ontario and some of the problems and benefits experienced in the past five years of use.

Location: 4th floor, opens directly off preschool unit

Size: Approximately 40 feet by 72 feet

Description: Cedar deck floor (small spaces between planks a disavantage for children with I.V.'s but all right for wheelchairs and water drainage.)
Sides are 4 feet plywood with additional 4 foot incline chain link fencing to give an 8 foot safety barrier

Permanent Structures: Colourful canopy to cover 15' x 12' with indoor outdoor carpet under it.
Sandbox on deck approximately 2' x 4', 8 flower and vegetable boxes 2' x 4'
2 closed storage areas, 4' x 12'
4 picnic tables (child size)
portable water tables (have inground water spray on playground for wheelchair and mobile patients. The water can drain freely and thus the risk of cross infection in minimized) The nearest water supply for deck is just outside the entrance door.

........2

Portable Equipment: Much of the play materials and equipment used is portable and stored on the deck.

Concerns: Our major problem with the deck has been leakage to 3rd floor about one year after we began to use it. The roof had not been properly prepared, and the cedar deck was not sectioned so that the floor could not be lifted up in sections but had to be "destructively" lifted up to fix the problem area. We have had no further problems but the children did miss many outside hours because of the problem.

Although most of our children do prefer the playground, the playdeck has always had appeal for children to eat meals outside, sunning for infants, play for preschoolers on unit, a breath of fresh air for children on portable respirators for which trip to playground is too far.

Both our playground and playdeck help to make hospitalization less confining in good weather.

Sincerely,

Denise Alcock

Denise Alcock,
Director,
Child Life Department

DA/sd

The University of Western Ontario

Faculty of Social Science
Department of Psychology
London, Canada N6A 5C2

September 27, 1979.

Ms. Katherine Davis,
Landscape Architect,
Dan Matsushita Associates Limited,
6225 Yew Street,
VANCOUVER, B.C. V6M 3Z1

Dear Mrs. Davis:

Re Potential of Roof-Deck Play Spaces,
Your letter of September 18, 1979

I am enclosing a diagram and brief description of our adventure-play roof-garden. The roof used is, however, not at the top of a high structure. It is on the roof of a section of the building which is three stories above ground level and it is sheltered by another section of the same building which is eight stories above ground level. Our architects were concerned, primarily, with the wind factor and were successful in giving us a play area which is sheltered by the tall section of the building from the prevailing winds, at least in the coldest months. In fact, there is rarely a day in the winter when it can not be used. We have a great deal of wind in May and June, but it is not a serious problem then.

Our other main concern was safety and we designed a fence with an over-hang that tilts inward in a way that makes it impossible to climb over. Another feature of the fence is that the children can see through the cracks and part of it is mesh so that they have a full view where the landscape is of interest. Also, the fenced-in area does not extend to the edge of the roof. Hence there is no feeling that one is on a precipice or "closed-in".

In Ontario, legislation (the Day Nurseries Act) does not permit nurseries for preschoolers in commercial buildings to be located more than two stories off the ground. Institutions such as educational ones like ours are considered special cases and nurseries on higher levels are permitted on a discretionary basis. However, in such cases, very special safety precautions must be taken especially with reference to fire.

...../2

If you would like to visit our preschool and take pictures of the roof-garden, we would be pleased to accommodate you or your representative.

Polly Hill, of Ottawa, helped us design the equipment in our gymnastics area. Perhaps you have heard of her already. If not, you could obtain her address from the Canadian Council on Children & Youth. I believe she has functioned as a Consultant for some architectural firms and may have accumulated considerable knowledge about how to design roof-top play space.

As you will realize, the weight factor is also an important consideration. Sand (for sand boxes) and soil (for planting) are heavy. Yet such is needed in play space for children. Drains are required and these must be big enough so that they will not clog if a little sand or other types of debris enter them.

I hope these comments may be of some help to you.

Sincerely,

MJW/lv.

Mary J. Wright, Ph.D., Professor and
Director, University Laboratory Preschool.

P.S. Our playground provides approximately 4152 square feet of play space. The surface is part cement (section where sand box and two-way tricycle track are located) and part wood (large area beyond the ramp). There is a slight incline from the cement area to the deck which presents a challenge to the children which is just about right for the age group served. Some areas are carpeted in green (e.g., large block area) and heavy rubber padding is used under all climbing equipment and at the bottom of the slides (for safety reasons).

If the playground is to be used in the heat of the summer, some protection from the sun is needed (we have a part of it roofed for rainy days but we don't function in the summer). We had to change our slide covers, however, to plastic, which does not heat up so much. Metal slides burn the children and even in May, June, and September we had problems with this.

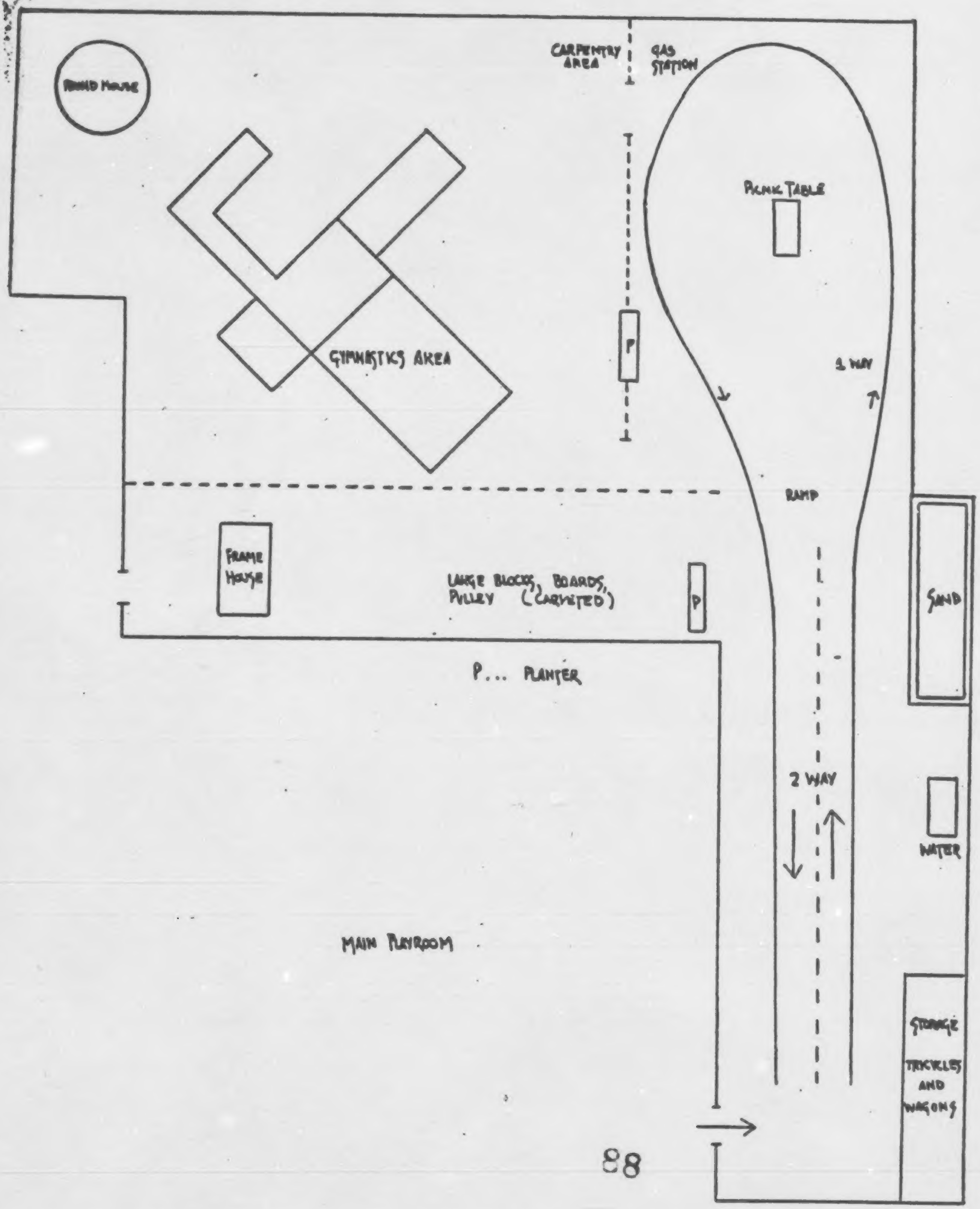

ROUND HOUSE
CARPENTRY AREA
GAS STATION
PICNIC TABLE
GYMNASTICS AREA
P
1 WAY
RAMP
FRAME HOUSE
LARGE BLOCKS, BOARDS, PULLEY (CARPETED)
P
SAND
P... PLANTER
2 WAY
WATER
MAIN PLAYROOM
STORAGE
TRICYCLES AND WAGONS

DIAGRAM 3: Design of the Playground (roof garden).

[illegible] – [illegible] – to [illegible]

The playground is also carefully designed and clearly divided into areas for specific types of activities (See Diagram 3). There is (1) a

- - - - - - - - - - - - - - -

Insert Diagram 3 about here

- - - - - - - - - - - - - - -

tricycle riding and wagon pulling area which contains a long, double-lane, two-way miniature highway which goes up a ramp and then becomes a single-lane, one-way, circular track which leads back down the ramp and onto the two-way street, (2) a gymnastics area which is equipped with a custom-built, large, high level, complex apparatus on which the children climb, slide, walk on rope bridges and ladders or hang on bars, (3) a large building area equipped with a frame house, boards and building blocks and pulleys, (4) a large sandbox with an associated waterplay area and (5) a carpentry centre. In addition to these centres there is other equipment on the playground such as rocker boats, teeter-totters, a tumbling mat, vehicle service equipment (e.g., a gas pump, associated with the tricycle track) a round house for dramatic play, planter boxes and the like. The design of the playground, shown in Diagram 3, is the way it is during most of the school year. During the winter, when snow is plentiful, sleighs and tobogans replace tricycles and wagons and other special winter equipment is introduced. Some photographs of the children at play in the preschool are provided in Appendix D.

L'Hôpital de Montréal pour Enfants
The Montreal Children's Hospital

UN HÔPITAL D'ENSEIGNEMENT • McGILL UNIVERSITY • A TEACHING HOSPITAL

M·C·H

October 2, 1979

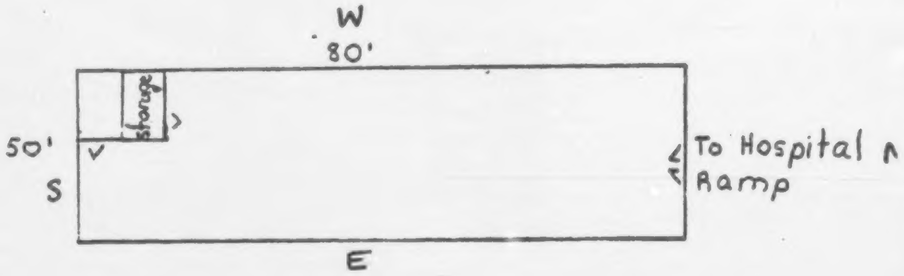
Katherine Davis, Landscape Architect
Dan Matsushita Association Limited
6225 Yew Street
Vancouver, B.C. V6M 3Z1

Dear Katherine,

Our director - Carolyn Larsen - has asked me to respond to your request for information on roof play spaces.

Given the highly urbanized setting of the Montreal Children's Hospital, the need was recognized to develop an open outdoor space as a children's environment. This was to be one that would encourage gross motor activity, group get-togethers, and an opportunity for the long stay patient to enjoy the out of doors (ie. a more normalized environment). To this end our roof play terrace was developed. (It had been in use as a recreational space for more than 15 years, but was completely redeveloped in 1974).

General Description:



The roof play terrace is approximately a rectangle with the dimensions shown above. Oriented toward the South (and the St. Lawrence River), the broad E side overlooks the center of the city and beyond to the mountains in the Eastern Townships of Quebec. The west side, toward residential and commercial areas, the North side being a brick wall of the hospital 6 storeys higher than the 8th floor play terrace.

The floor is covered with Chevron's Dry Turf and has held up reasonably well. It is green in color. The sides are a solid wood and brick wall up to a height of 3-4 feet. Above this a lexan (3/16 inches) and wood partial wind barrier approximately 7 feet high.

2300 TUPPER, MONTRÉAL, QUÉBEC H3H 1P3 • (514) 937-8511

The equipment and furnishings for children and families that has been or is being used currently include:

WATER FOUNTAIN, WADING POND, WATER TABLES FOR CHILDREN IN WHEELCHAIRS OR BED

SAND BOXES (WET AND DRY), SAND TABLE FOR WHEELCHAIR OR BED-CONFINED CHILDREN

LARGE SLIDE, GIANT BEAN BAG PILE, CRAWLING TUNNELS AND TUBES

TETHER BALLS HUNG AT DIFFERENT LEVELS

RETRACTABLE TABLE AND EASEL

PERMANENT WOODEN TABLES AND SEATING, MANY PLANTERS

LOG CLIMBING CLUSTERS (ALSO USED TO DEFINE ACTIVITY AREAS)

NUMEROUS COVERED WASTE RECEPTACLES

CHILDREN'S TOYS, CRAFT EQUIPMENT, BICYCLES, "PINT-SIZE" VEHICLES, SAND PLAY IMPLEMENTS, GARDENING TOOLS, BAR-B-QUE, ETC.

I am enclosing some slides that indicate how children enjoy this space. It should be noted, however, that it is often utilized as a refuge for parents and staff as well.

It is hoped that this is the kind of information you are seeking. If more data is required you may correspond with me or contact the landscape architect in charge of this project:

Susan Miller-Rabinovitch, AAPPQ
4290 Montrose
Montreal
(514) 932-1715

Further, you are probably aware of the IPA - International Playground Association. I think several of its members have faced this issue as well. They may be able to offer expertise. Also, the Children's Hospital of Eastern Ontario in Ottawa has a play terrace (plus a playground). Possibly Denise Alcock, Director of Child Life could provide you with information on their set-up. Here in Montreal, I believe the Central YWCA on Dorchester Boulevard has a day care center outdoor play terrace, but that's about all I know about it. University Settlement, an inner city community development center, has roof gardens, but perhaps there is more there as well. Their address: 3553 rue St. Urbain, Montréal, phone (514) 842-8836.

If I don't hear from you again, I would like to wish you well in this undertaking. Should this project result in the publication of a paper, I would very much appreciate receiving a copy.

Sincerely,

Joe J. Bontems

Joe J. Bontems
Child Life Department

CITY PLANNING DEPARTMENT

CITY OF VANCOUVER

453 West 12th Avenue, Vancouver
British Columbia, Canada V5Y 1V4
Telephone 873-7344 Area Code 604

Ray Spaxman, Director

File No. H.35.F.10.
Date 79.09.18.

Ms. Katherine Davis,
Landscape Architect,
Dan Matsushita Associates Ltd.,
1950 West 16th Avenue,
Vancouver, B.C.
V6J 2M4

Dear Ms. Davis:

Thank you for your letter of September 4th, requesting information on roof decks as play space.

This was an issue we considered during our recent Housing Families at High Densities study. While we did no independent research on user acceptability of this idea we did ask the cost consultant (John Downward Ltd.) to estimate the costs of making roofs of 3-storey apartments suitable for use by children (load capacity to accommodate some top soil and hard surfaces for play). The conclusions of that study were to suggest that given CMHC maximum house prices it was not a realistic option. We concluded that we were better off in terms of cost, security, and useability to assist projects to locate adjacent or near parks.

Beyond this analysis we can provide no further insights into the idea. I am not aware of roof decks in family housing in the City. The only examples which come to mind are on community centres or hotels.

For information I have enclosed a copy of our guidelines. If as a result of your analysis you gain some insights which might be of assistance to the City in future discussions of the feasibility of roof decks I would be very interested in receiving the information.

Best wishes with your study.

Yours truly,

Ann McAfee

Dr. Ann McAfee,
Housing Planner,
Overall Planning Division.

AMcA/mjs
Encl.

UNIVERSITÉ DE MONTRÉAL

Montreal, October 29th, 1979

Mr. Dan Matsushita,
Landscape Architect,
6225, Yew Street
Vancouver, B.C.
V6M 3Z1

Dear Dan,

Please excuse my delay in getting back to you concerning your research project about children's play areas on roof decks.

Pierre Teasdale and I discussed the research he had done as part of our earlier CMHC study; the most obvious fact is the very small number of roof decks which make any provision for children's play at all. The enclosed sheets include all those that Pierre investigated (either through books and magazines or by visiting) which had any such facilities. He did not visit the U.S. examples, from Princeton (which I think was published in Progressive Architecture), but did visit the British examples. The most famous children's playground on a roof is that at Le Corbusier's Unité d'Habitation, at Marseilles, France, but I am sure you are familiar with that.

I am sorry not to be able to give you more help. Our report "Roof Decks - Design Guidelines" does have some discussion of children's play, games and sports, security and vandalism, but it is quite brief. So little seems to have been done in this field that a strong emphasis on "prototype design" might be a good way to orient your study.

With best regards; please let me know if there is any help that I can offer you.

Yours sincerely,

Ron.

Ron Williams,
Director,
Ecole d'Architecture de paysage.

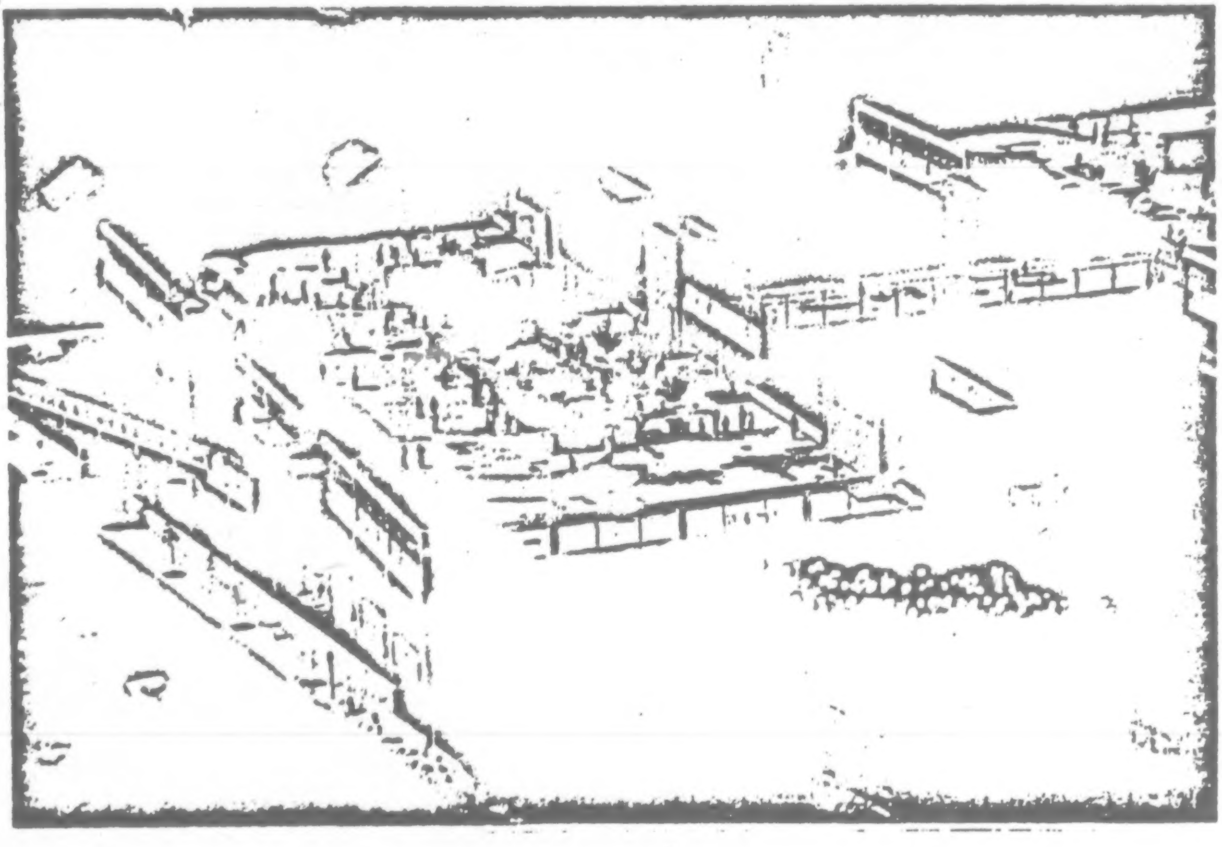
ÉCOLE D'ARCHITECTURE DE PAYSAGE
FACULTÉ DE L'AMÉNAGEMENT
5620 Ave Darlington
Montréal, Qué. H3T 1T2

/csd

A. BUILDING YEAR OR SOURCE OF INFORMATION YEAR: -
B. BUILDING NAME: Hart Middle School
C. BUILDING USE: School
D. DECK USE: Roof top play area
E. DESIGNER: Uniplan, Princeton, N.J.
F. BUILDING LOCATION: East Orange, N.J., U.S.A.
G. GENERIC BUILDING CONTEXT:

"Filling the site also had drawbacks —no land left for parking or playgrounds. An underground parking garage proved to be beyond the scope of the budget, so it was decided that cars would just have to park on the street or in a nearby athletic stadium parking lot. And play areas would have to make the most of the only open space left, the roof-top surfaces."

The main building blocks are offset by the playful ramps linking the roof-top play areas to each other, and to the ground. The prominence of the ramps is important, because they express the concept of community use. Both the roof-tops and the athletic facilities are meant for public as well as school functions."

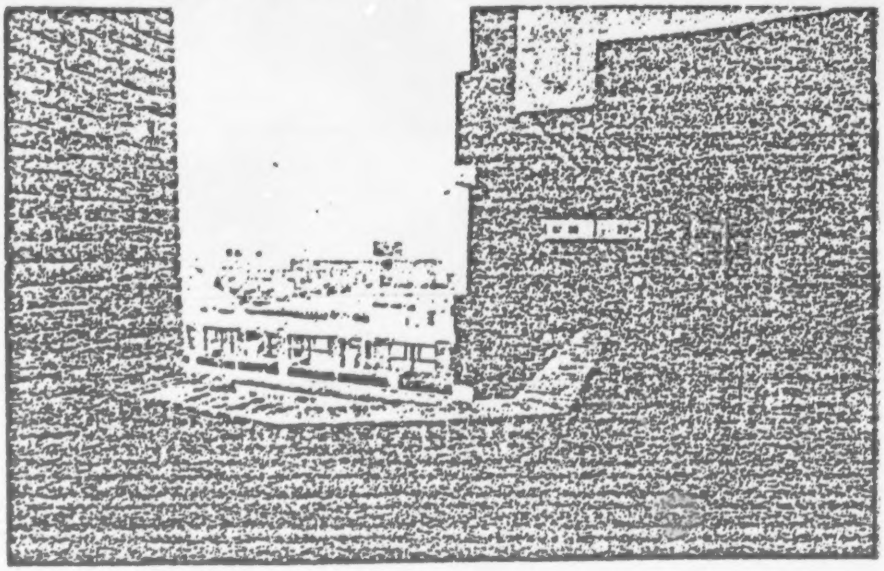


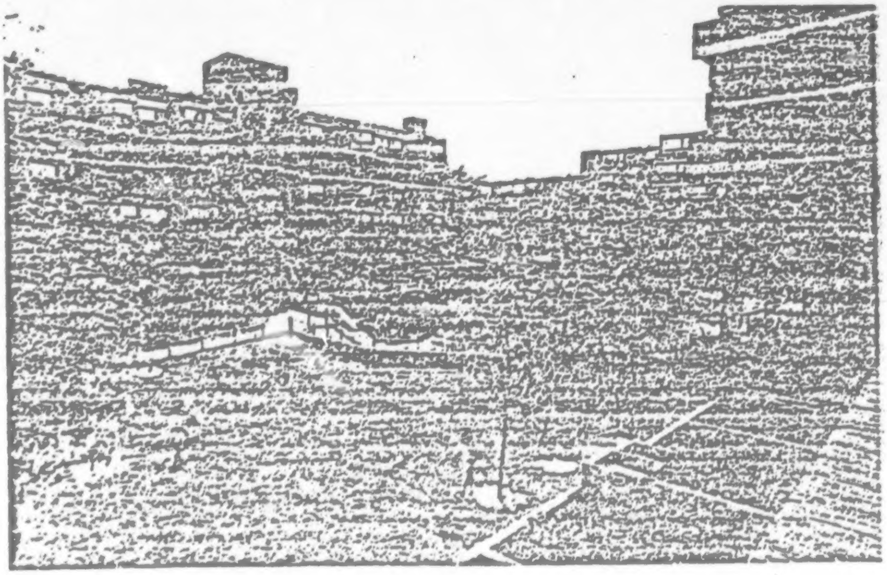
A. BUILDING YEAR: 1972
B. BUILDING NAME: Lillington Street
C. BUILDING USE: High Rise Stacked Apartments and Flats
D. DECK USE: Deck level streets and little "Places"
E. DESIGNER: Darbourne and Darke
F. BUILDING LOCATION: Lillington Street, Pimlico, London, England
G. GENERIC BUILDING CONTEXT:

We were told by a G.L.C. architect that the Lillington Street housing project in Pimlico had had a great influence on the development of high density housing in England. This housing project was the result of an architectural competition held in the early 1960's. In this project all the blocks are connected to one another by deck streets. This intermeshing of all elements conveys a pleasant feeling of irregularity, complication, and informality. By joining the ranges of buildings together and linking the access galeries, the whole complex was made to look very homogeneous. One disadvantage to this however is that when the buildings join at right angles, some dark corners are created. But the scheme has romantic, even picturesque, aspects and darkness is a natural result of that aesthetic. We have read: "that to begin with, prospective tenants were wary of the new architecture. They tended not to be able to find their way back to their flat." Now that Lillington Street has settled down, the project is apparently quite popular with the residents. We also read about a small boy being interviewed on a BBC program as to whether he preferred living in flats or houses. He said he preferred flats "because there was more space to play in at ground level, around the buildings, which was better than having to play in a small garden with no large spaces nearby." One architect wrote that it would be difficult to draw firm conclusions from such a casual interview, but that such an impression was also in his mind when walking through the interconnecting courts and deck streets, liberally provided with play equipment, and play spaces both formal and informal. In this project, there is also an elaborate playground area that was built on the roof of an electricity sub-station. This project also has flats for elderly citizens and has a hostel for them right in the center of the scheme. We read that many of the old people appreciate being in the middle of everyday activities but that some of their flats are near children play areas. In the summertime, the children are hard at play until late at night, day-in and day-out. And we read that all this noise and activity became too much for the senior citizens and led to some of the equipment being locked up for a period. This project is also famous for its trees and shrubs both at ground level and on the access galleries. The deck streets are of great interest in themselves. They were designed to get away from the straight, regular street decks so familiar in many projects. The floor of the street decks is brick paved and the galleries vary in width. The feeling when walking along those streets from block to block is of constantly changing scenes, where one is sometimes under cover, like a cloister, and at other times open to the sky. At intervals, short corridors at right angles to the galleries provide access to, say, three-flat entrance doors, often with a short flight of steps. To conclude, this type of deck street housing system seems to work very well. Another feeling, when walking along these streets, tends to be of a lot of front doors and a few windows. There is, however, a high degree of privacy along these decks. An interesting observation that

LILLINGTON STREET, London, England (cont'd...)

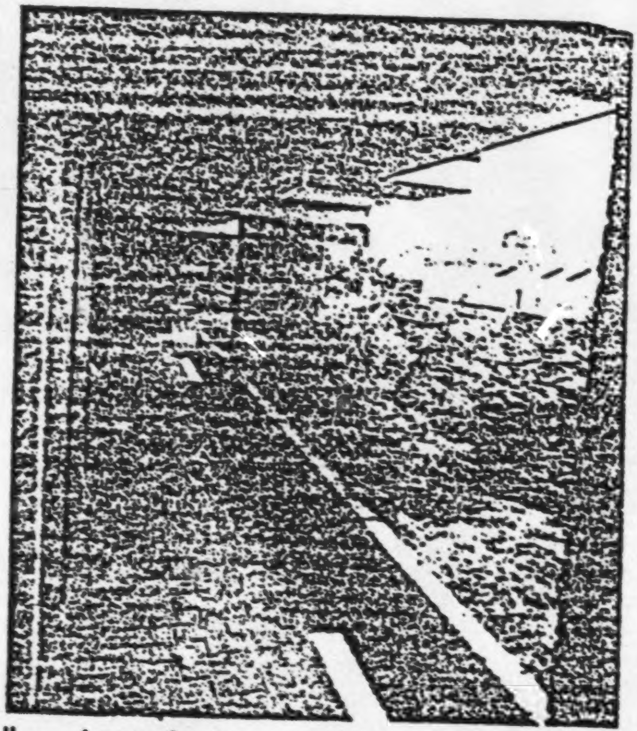
we have made about what goes on on those streets was that tenants have gone in for displays of potted plants hanging on the streets or ledges near the entrance doors. Finally, the problem was raised that authorities are a bit worried by the ease with which adventurous climbing children can reach the roof. It was in fact necessary in some areas to erect defensive screens to keep children safe from harm.



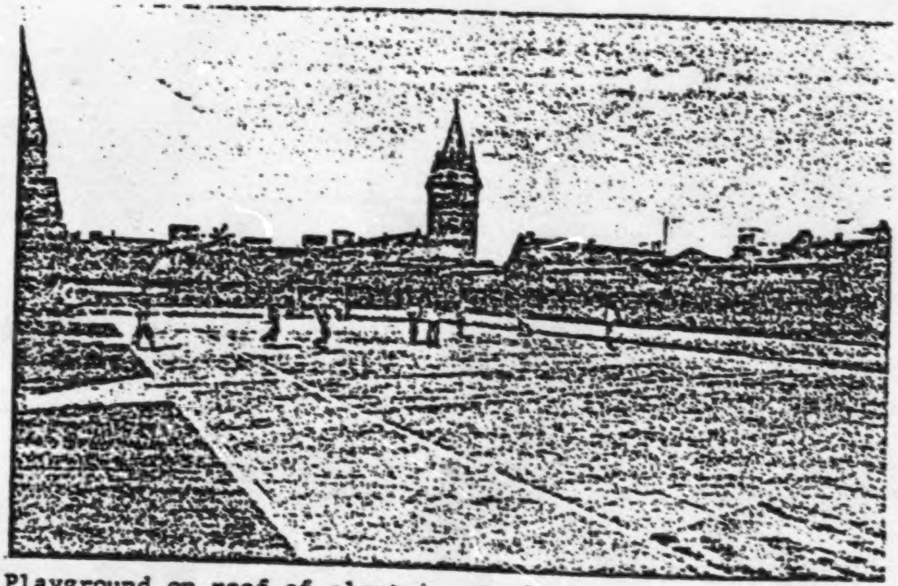


"... constantly changing scenes along deck streets..."

LILLINGTON STREET, London, England (cont'd...)



"... irregularity, complication, and informality along a deck street..."

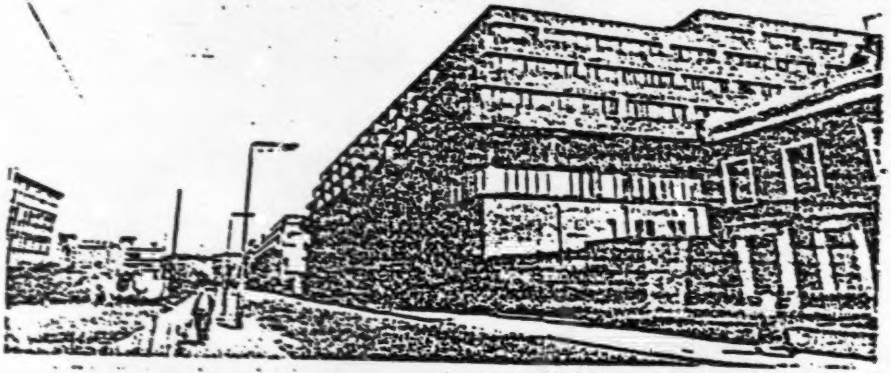


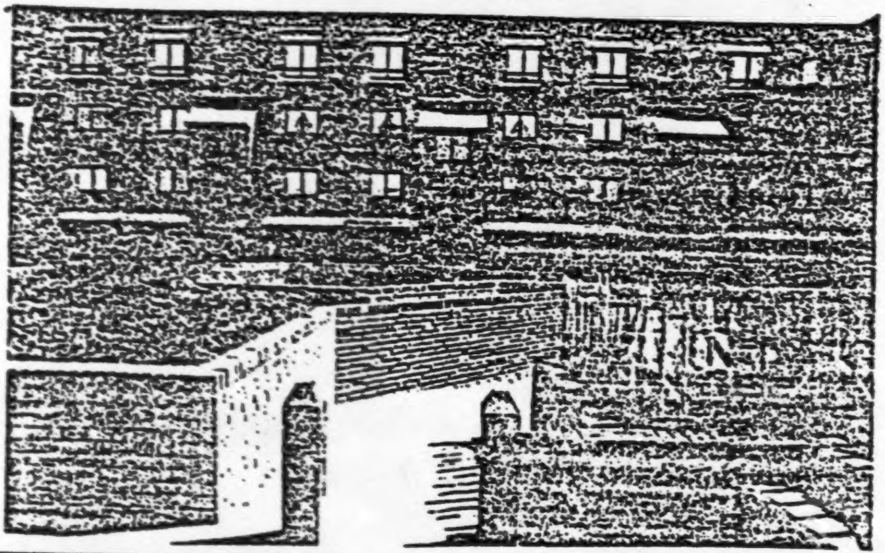
Playground on roof of electric station

Standardized fiche No.: 618

A. BUILDING YEAR: Unknown
B. BUILDING NAME: Cromwell Road
C. BUILDING USE: Apartments above Municipal Depot
D. DECK USE: Playgrounds, gardens, and paved circulation areas
E. DESIGNER: Kensington Borough, Architect
F. BUILDING LOCATION: Kensington, London, England
G. GENERIC BUILDING CONTEXT:

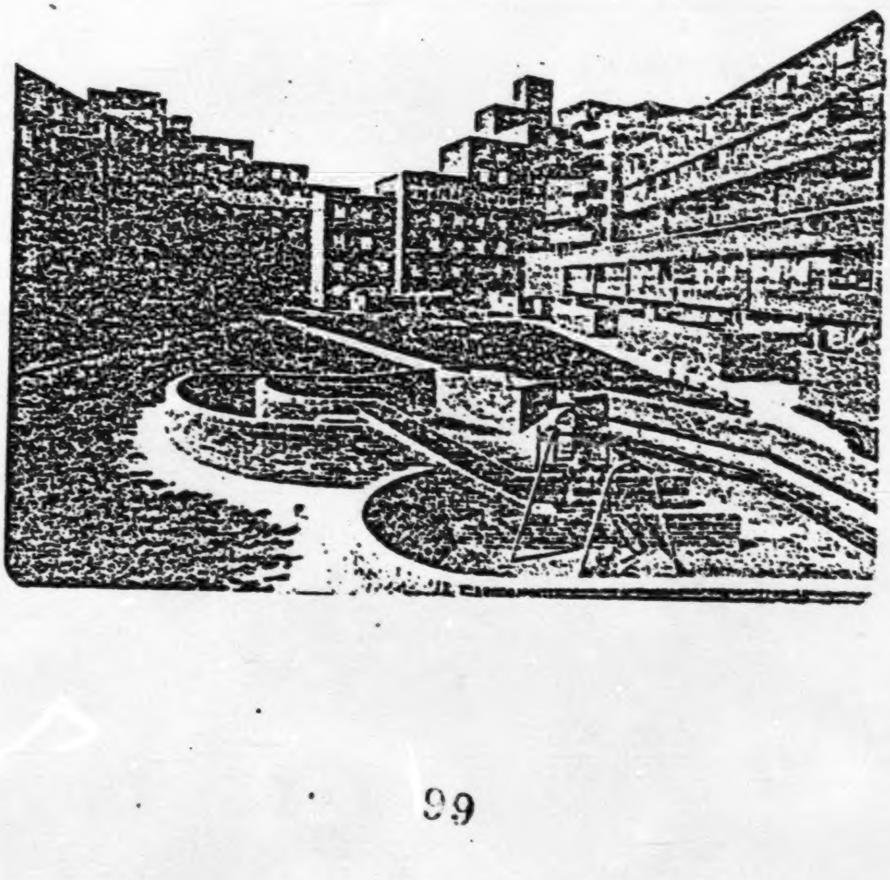
This project, like Woodgreen (no. 617), has a roof top court. In this case apartments and flats of three to four stories were built on top of a three-story municipal depot. As in Woodgreen, the court was created by laying the housing units on the edge of the building. The court itself was very highly landscaped. It included a whole series of specialized areas, some enclosed, some partly open, where for example children of different age groups could play or where adults could grow vegetables. It also included shrubs and flower planting boxes, sitting areas furnished with comfortable benches. This court is one of the few roof decks that we have visited that was planned in such details. When sitting in that court, one does not only have the complete illusion that he is at ground level, but also has the impression to be within a completely furnished "exterior-room".





A. BUILDING YEAR: Unknown
B. BUILDING NAME: Spencer Ave.
C. BUILDING USE: High Rise Housing Complex
D. DECK USE: Deck level streets
E. DESIGNER: Islington Borough, Architect
F. BUILDING LOCATION: Spencer Ave., Islington, London,England
G. GENERIC BUILDING CONTEXT:

Spencer Avenue is a multi-storey housing complex with deck level streets. It differs from other deck level streets projects that we have visited by the simplicity of its overall layout. It is essentially composed of three blocks connected by deck streets, laid in a U-shape, and thus forming a large interior court. This interior court can almost accommodate play activities of children of all ages. The street decks, however, have been planned almost strictly for circulation and are not particularly interesting for the study.



PROJECTS SUPPORTED BY CMHC AS PART OF THE RESEARCH AND DEVELOPMENT PROGRAM UNDERTAKEN BY THE CHILDREN'S ENVIRONMENTS ADVISORY SERVICE (CEAS) FOR THE INTERNATIONAL YEAR OF THE CHILD

The research reports from the following projects are available through the CEAS Resource Service from CMHC National Office and CMHC Regional Offices.

1. INTERNATIONAL INVENTORY AND COMPARATIVE STUDY OF LEGISLATION OF PLAY SPACES

   This will provide a basis for comparison of CMHC standards and policies with those of other countries, regarding the allocation of space for children in the residential environment and is seen as a resource for municipalities establishing such standards.

   Aussi disponible en français.

2. HOUSING CANADA'S CHILDREN - A DATA BASE

   The compiled statistics will provide a profile of Canadian children and their housing.

3. MAINTENANCE AND RETROFITTING COSTS OF CHILD-RELATED FACILITIES IN THE REAL ESTATE PORTFOLIO

   Life cycle costing of child-related facilities and maintenance costs due to lack of child-related facilities will be used to determine cost effective solutions.

4. EVALUATION OF EXTERIOR FACILITIES FOR CHILDREN IN THREE LOW INCOME PROJECTS

   The report will provide an evaluation of three approaches to play space design in terms of play experiences, use by different age groups, accessibility, and resident satisfaction, using a technique that allows children to respond naturally.

5. CHILD'S PERCEPTION OF THE NEIGHBOURHOOD

   The study will document how children use selected urban neighbourhoods that vary in character and the influence of the design of the neighbourhood on the children's activities.

6. HOUSING NEEDS OF URBAN NATIVE FAMILIES - A COMPARATIVE STUDY OF CHILDREN'S AND PARENTS PERCEPTIONS

   A study of the needs of native children and their parents in the area of housing, neighbourhood and community, on the basis of which housing strategies can be developed to respond to their needs in the urban setting.

7. WORKSHOP: "HOUSING THE FAMILY IN 2001", FOURTH CANADIAN CONFERENCE ON CHILDREN

   The report deals with the changing family structure, the needs of children and the suitability of present forms of neighbourhood design to house the future family.

8. LOST AND FOUND: RECYCLING SPACE FOR CHILDREN

   The study deals with the identification of waste or unused spaces in residential projects and design suggestions to recycle them into play spaces for children.

9. OUT OF THE CELLAR AND INTO THE PARLOUR - GUIDELINES FOR THE ADAPTATION OF RESIDENTIAL SPACE FOR THE CARE OF PRE-SCHOOL CHILDREN

   The study will utilize existing knowledge of indoor and outdoor environmental requirements of children in order to accommodate the developmental needs of pre-schoolers in conventional family living space.

10. PRAIRIE WINTER PLAY PATTERNS

    The project goal is to provide for children's play during the winter months, and will be conducted in two parts: (a) A study of social and environmental factors influencing children's activities in winter, and (b) A study of climatic, topographical and environmental factors that must be considered in the design of winter play facilities that accommodate physical, social, creative and intellectual play.

11. DESIGN CRITERIA FOR THE DEVELOPMENT OF A SHELTERED PLAY SPACE IN MEDIUM TO HIGH DENSITY FAMILY HOUSING PROJECTS IN THE ATLANTIC REGION

    The report will examine the need for sheltered play facilities in high density family housing projects and recommend design details such as location, size, space allocation, construction materials, and play facilities.

12. PROJET PARAPLUIE - A USER GENERATED SHELTER DESIGN FOR THE RECREATION OF SCHOOL-AGE CHILDREN IN A MONTREAL PROJECT

    The report will document a procedure that was used to involve school age children and their parents in the design, implementation, maintenance, and management of a sheltered play space, as a possible model for other residential developments.

    Aussi disponible en français

13. GUIDELINES FOR THE SELECTION OF CONSTRUCTION MATERIALS, CONSTRUCTION METHODS, LANDSCAPE MATERIALS AND VEGETATION USED IN PLAY SPACES

    An inventory of materials, finishes and methods with a description of qualitative characteristics and possible use in a play space in terms of user groups, climatic conditions, availability and maintenance will be produced.

14. PLAY SPACES TO ACCOMMODATE DISABLED CHILDREN

    Design suggestions will be developed for an integrated play space that accommodates both disabled and normal children.

15. CHILDREN'S PLAY SPACES ON ROOF DECKS

The study will result in design suggestions that deal with the technical aspects, such as drainage, containment, and control of the microclimate, as well as the provision of stimulating play opportunities for child users.

16. LA SECURITÉ DES ENFANTS VS LA CIRCULATION - AUTO

The study will analyze accident statistics and traffic patterns in selected multiple housing projects and develop design suggestions in terms of traffic separation, lighting, landscaping, barriers, etc., to minimize the conflict between automobiles and children.

17. A CASE STUDY OF A COMMUNITY PARTICIPATION PROCESS FOR IMPROVING A NEIGHBOURHOOD TO BE MORE SUPPORTIVE OF CHILDREN AND YOUTH.

The case study will identify the process of community participation, the mechanisms available, the problems faced, and the resources tapped, and will serve as a model for other communities.

18. ADAPTATION OF CMHC DESIGN GUIDELINE ADVISORY DOCUMENT "PLAY OPPORTUNITIES FOR SCHOOL AGE CHILDREN, 6-14 YEARS", TO MUNICIPAL LEGISLATION

An example or model policy guideline on planning for play for school age children that is applicable to the municipal residential development control approval process and is written in such a way as to be easily adopted by municipalities.

19. MANAGING URBAN SPACE IN THE INTEREST OF CHILDREN

The proceedings of the International Symposium, dealt with the allocation of urban space to respect children's interests and the political, legal and socio-economic conditions required for various forms of organizations to function adequately. The report has been published by "Man and his Biosphere", the organizers of the symposium. Requests received will be forwarded to "Man and his Biosphere".

20. INCENTIVES AS AN AID FOR IMPROVING THE QUALITY OF THE FAMILY HOUSING ENVIRONMENT: A POSITION PAPER

The position paper will investigate alternatives which can serve as incentives to developers under the National Housing Act, to provide children's facilities within residential developments.

21. MONOGRAPH SERIES

Titles will be announced in the CEAS newsletter.